

BALLY MANUFACTURING CORPORATION,
a Delaware corporation,
Plaintiff/Counterderendant,

vs.

D. GOTTLIEB & CO., a corporation,
WILLIAMS ELECTRONICS, INC., a
corporation, and ROCKWELL INTERNATIONAL
CORPORATION,

Defendants/Counterplaintiffs.

VOLUME XVI-A
TRANSCRIPT OF PROCEEDINGS
BEFORE THE HONORABLE JOHN F. GRADY

TRANSCRIPT ORDERED BY: MR. JEROLD B. SCHNAYER
MR. MELVIN M. GOLDENBERG

APPEARANCES:

For the Plaintiff/
Counterdefendant:

MR. SCHNAYER
MR. BURNS
MR. TONE
MS. SIGEL

For the Defendants/
Counterplaintiffs:

MR. LYNCH
MR. HARDING
MR. GOLDENBERG
MR. RIFKIN
MR. ELLIOTT

COURT REPORTER:

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March 19, 198
9:50 a.m.

OCT 30 1984

DOCKETED
NOV 08 1984

Frederiksen

THE CLERK: 78 C 2246, Bally Manufacturing v.

Gottlieb, case on trial.

THE COURT: Good morning, counsel.

MR. TONE: Good morning, your Honor.

MR. LYNCH: Good morning, your Honor.

As an initial matter, your Honor, I would like to record for the record that I've marked for purposes of identification as Defendants' Exhibit 19-K the sketch of the infringement aspects of lamps, switches and digits comparing Flicker, Cleopatra, and Spiderman.

If Mr. Frederiksen would resume the stand.

JEFFREY E. FREDERIKSEN, PLAINTIFF'S WITNESS, PREVIOUSLY SWORN.

CROSS EXAMINATION (Continued)

THE COURT: Good morning.

THE WITNESS: Good morning, your Honor.

BY MR. LYNCH:

Q Mr. Frederiksen, on Friday before we ceased I had asked you about the late dated chips that existed in Flicker. And I believe you indicated you had no recollection of how they came to be in Flicker.

A That is correct.

Q And that is still your testimony, correct?

A Yes.

Q Now, the second aspect of Flicker where it departs from

1 the documents that were alleged to represent it, both in the
2 Patent Office and in the trial, had to do with the chips,
3 correct?

A Yes.

4 Q And you testified that you changed the 14050 chips at
5 every instance where a 4 appears on the marked-up version of
6 28, you changed those to 14049's, correct?

7 A No, that is not correct.

8 Q Well, please correct me, Mr. Frederiksen.

9 A I have no recollection or -- I have no recollection on
10 the center group of four buffers. I'm not sure that they are
11 or are not in there.

12 Q You're not certain whether these are 14049's or 14050's,
13 that is, the center group?

14 A Yes, that's correct.

15 Q You have a recollection of making a change with respect
16 to two?

17 A The only change I specifically have some recollection
18 of is the one in the upper right-hand corner, the test wire.

19 The other change on the left side was
20 something that was accomplished by the technician in the
21 process of wiring for economy of packages, that I did not
22 have any specific recollection of.

23 Q Now, are you certain that all of these occurred prior
24 to September 26, 1974?

25 A Yes.

Q You also testified that a -- the last item in the picture, 28-A, was in fact not in Flicker, correct?

A I did not need that for the switch inputs, but I don't know whether or not it's in the actual computer itself.

1LP, 1 Q Do you know if there is an additional 14502 chip?

2 A No, I do not know.

3 Q The one above that, marked 2 on Plaintiff's Exhibit
4 28-A, substitutes a 14016 for a 14502, correct?

5 A Yes.

6 Q Those are similarly functioning chips you testified?

7 A Yes, one is just the inversion of another.

8 Q I thought that this was a transmission gate against
9 a latch.

10 A Neither one are a latch.

11 Q I am sorry, a tri-state buffer as opposed to a trans-
12 mission gate..

13 A Yes, they both serve a tri-state function.

14 Q Then you testified that number 3 on 28-A was a drafting
15 error?

16 A Yes.

17 Q Those changes in chips, I believe you testified, were
18 inconsequential or were not material, correct?

19 A Yes.

20 Q As another matter, Mr. Frederiksen, do you have a recol-
21 lection of how many credit digits were on Flicker on the
22 date of September 26, 1974?

23 A The same number that are there now. I don't recall any
24 changes.

25 Q Defendants' Exhibit 4-G is a letter, which is a Bally

1 letter. Now, it was written by Mr. Bracha.

2 Mr. Bracha was one of the individuals who attended
3 the demonstration on September 26, correct?

4 A I believe so.

5 Q That is September 26, 1974.

6 Mr. Bracha indicates in his letter, Exhibit 4-G,
7 at line 5 on the first page:

8 "The LED displays have replaced our score counting
9 assemblies and one digit of the credit assembly."

10 On the third page of the same exhibit it says:

11 "Credit counter needs one more character."

12 Does that refresh your recollection?

13 A No, it does not.

14 Q Is it possible that your recollection is bad, Mr. Fred-
15 eriksen, and that indeed Flicker had only one digit at the
16 time of the September 26, 1974 demonstration?

17 A I don't recall any changes in that area.

18 Q Do you know how many digits it has now?

19 A I don't recall.

20 Q I suggest to you that if it were operative, it would
21 have two digits now. Can you verify that without it being
22 lit?

23 A I think it would be in the mux chart.

24 Q Is the mux chart Figure 4 of the patent?

25 A It shows two digits of credit.

1 Q It shows credit units and credit 10s, correct?

2 A Yes.

3 Q And you have no recollection of a change in that area?

4 A No, that is the way that it must have been on that
5 date.

6 Q You regard Mr. Bracha's comments as being mistaken?

7 A I believe so.

8 Q Let me ask you this, Mr. Frederiksen.. I am going to
9 show you -- you have already testified, Mr. Frederiksen,
10 that Exhibit 49, Exhibits 50, 51, 52 and 53 are drawings that
11 were prepared later after September 26, 1974 but reflected
12 the condition of the machine on September 26, 1974, is that
13 correct?

14 A I believe so.

15 Q When were those drawings prepared?

16 A The date on the drawings are 19 December 1974 on these
17 two.

18 Q You so testified here and do you recall making an affi-
19 davit in the Patent Office that the drawings that are now
20 marked as 49 through 53 reflected the Flicker on September
21 26, 1974?

22 A I don't specifically recall that, but I imagine it is a
23 matter of record.

24 Q Those drawings were all made by whom, Exhibit 49 through
25 53, Mr. Frederiksen?

1 A These drawings were all made by Paul Smith.

2 Q They are all indicated to have been made on December
3 19, 1974, correct?

4 A That is correct.
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1 Q As reflecting the Flicker condition earlier on September
2 26, 1974?

3 A I believe so.

4 Q Now, I would like to show you another drawing, Mr.
5 Frederiksen, which I will mark as Defendants' Exhibit 2-R.

6 Your Honor, this is not in your book. If I may,
7 that is the white-on-black one that I am giving the Court,
8 black-on-white.

9 BY MR. LYNCH:

10 Q Mr. Frederiksen, now, that is an MCI drawing, is it not,
11 or a drawing of Dave Nutting Associates?

12 A Yes.

13 Q That was prepared by Paul Smith on December 20th, 1974,
14 correct?

15 A That is what the drawing says.

16 Q The same person who prepared the other set of drawings,
17 and it was prepared on the day after, Exhibits 49 through 53,
18 correct?

19 A Yes.

20 Q Now, what does Exhibit 2-R show, Mr. Frederiksen?

21 MR. TONE: Excuse me, your Honor. We do not seem
22 to --

23 Could we have a minute to look at what Mr. Lynch
24 is using and try to locate it?

25 THE COURT: Why don't you take my copy, and I will

1,2

1 read over Mr. Frederiksen's shoulder.

2 MR. TONE: Thank you.

3 MR. LYNCH: Here is a copy.

4 MR. TONE: We can borrow Mr. Lynch's, your Honor.

5 MR. LYNCH: It is Document 386.

6 BY MR. LYNCH:

7 Q Isn't it the fact that Exhibit 2-R represents the
8 condition of the Flicker Computer at the time?

9 A No, it does not. This is a proposed production computer
10 and I really do not specifically recall this particular
11 drawing, but it does not reflect the E-PROM computer that was
12 used in the Flicker.

13 Q That computer has how many ROMs, that drawing?

14 A Three ROMs.

15 Q Now, Mr. Smith made this drawing on the day after he made
16 all the other drawings, correct?

17 A Yes.

18 Q At that time he was preparing a whole set of drawings of
19 the Flicker, correct?

20 A Yes.

21 Q None of the drawings, 49 through 53, reflect the
22 computer arrangement of the Flicker, do they?

23 A No.

24 Q That is correct. None of them reflect the computer
25 arrangement, correct?

1 A. That is correct.

2 Q. Now, Exhibit 2-R, which we have just marked, indicates
3 that there were only 3 ROMs on this particular computer
4 arrangement, correct?

5 A. Yes.

6 Q. There are four ROMs on Flicker, correct?

7 A. Yes.

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1 Q I'd like to ask you to refer to Exhibit 53. Exhibit
2 53 is the mux chart, is it not?

3 A Yes.

4 Q The mux chart, Exhibit 53, drawn by Mr. Smith, is
5 specific to Flicker, is it not?

6 A Yes.

7 Q Now, on the right of the mux chart there is an indica
8 tion of the existence of three ROMs. Isn't that correct?

9 ROM 0, ROM 1, and ROM 2, there being a total of three ROMs,
10 correct?

11 A Yes.

12 Q In that respect it is the case, is it not, that
13 Exhibit 52 is consistent with Exhibit 2-R in showing an
14 arrangement of Flicker that would have three ROMs, not four.
15 Correct?

16 A In regards to the I/O requirements, that would be true
17 although this drawing does show expandability for additional
18 ROM code if it were required.

19 Q I understand that. But Exhibit 53 shows three ROMs,
20 indicates three ROMs, and it is consistent with Exhibit 2-R,
21 is it not?

22 A I believe so.

23 Q Now, I'd like for you to step behind the Flicker
24 machine with me, Mr. Frederiksen.

25 (Brief interruption.)

1 BY MR. LYNCH:

2 Q Now, I'd like to ask you, Mr. Frederiksen, to look at
3 the board, the logic board of the Flicker machine.

4 The logic board of the Flicker machine we
5 are looking at there, we're looking at the back of it,
6 correct?

7 A Yes.

8 Q And I'm supposed to have a picture of the front of it,
9 but I don't seem to have it.

10 MR. LYNCH: Do we have a picture of the front of
11 the board.

12 (Brief interruption.)

13 BY MR. LYNCH:

14 Q I have what has been previously marked as -- well, I
15 guess it hasn't been marked here -- but I have a board here,
16 the picture of that same board, and the white chips on that
17 picture are the E-PROMs. Isn't that correct, Mr. Frederiksen?
18 A Yes.

19 Q And the way I am holding the board indicates that on
20 the logic board in the Flicker there is an E-PROM in the
21 upper right corner --

22 A Yes.

23 Q -- in the top row.

24 Then two chips that are not E-PROMs, and then
25 three remaining chips. Correct?

A Yes.

Q This fourth E-PROM chip is the chip, if you will recall, Mr. Frederiksen, that bore your notation 10-25-74. Correct?

A I don't recall explicitly, but I have no reason to disbelieve you.

Q Well, I will show you that picture in a moment, Mr. Frederiksen.

Now, Mr. Frederiksen, I call to your attention that the majority of the board is wired in yellow wire.

A Yes.

Q And that a fourth PROM or ROM element appears separated from the other three. Correct?

A Yes.

Q That PROM element is also wired entirely in another color of wire, is it not, Mr. Frederiksen?

A Yes.

Q It is wired entirely with red wire. Correct?

A Yes.

1 Q
2 Now, Mr. Frederiksen, does that not indicate to you
3 that the first three ROMs or PROMs were wired at a different
4 time than the fourth?

5 A
6 That's possible.

7 Q
8 Under what circumstances, Mr. Frederiksen, would you a
9 a designer separate a fourth ROM from three other ROMs?

10 A
11 In the instance if during the programming of it, I
12 needed more code space, I would have tacked on another ROM.

13 Q
14 And all of the wiring would have changed, is that
15 correct? You would have used different wiring for that
16 purpose if it was in the same process, the same design
17 process?

18 A Yes.

19 Q
20 So your testimony then is, although this ROM is wired
21 differently, although the drawings indicate that Flicker was
22 a three-ROM machine, that this fourth ROM existed.

23 A
24 From a hardware point of view I did always have the
25 hope of getting it back into three ROMs, but for the sake of
a prototype there was no production efficiency that I had to
obtain at this time.

Q I show you, Mr. Frederiksen, once again the photograph
of the chips, turned over, and ask you to confirm that the
fourth ROM bears the date of 10-25-74 in your hand.

A Yes, it does.

Q you can return, Mr. Frederiksen.

(Brief interruption.)

BY MR. LYNCH:

Q

Now, did you have in fact that problem, Mr. Frederiksen that you ran out of ROM space and ran out of memory space?

Did that occur?

A

I don't specifically recall, but if I used four ROMs I must have needed the space, and the code seems to reflect that.

Q

We'll get to that in a moment.

The fact of the matter is, Mr. Frederiksen, is that it is true, is it not, it is not common practice for you to put four ROMs in that arrangement of three together and one separated, if you needed -- if you knew you needed four ROMs worth of space initially. Correct?

A Yes.

1 Q. Mr. Frederiksen, do you have any recollection of itera-
2 tions leading from three to four ROMs in the development of
3 the Flicker machine?

A No, I do not.

Q I show you, Mr. Frederiksen, what was marked as Exhibit
2-K.

Exhibit 2-K, Mr. Frederiksen, is a letter
from Dave Nutting Associates to Mr. Daniel Conroy of Bally,
correct?

A Yes.

Q It is dated October 18, 1974, which would have been
after the date of the demonstration, correct?

A Yes.

Q It indicates in the second paragraph that:

"Dave Nutting Associates has progressed forward
with the final evolution and production design of
the Bally Brain."

Now, it was the Bally Brain system that was in the
Flicker, wasn't it, Mr. Frederiksen?

A I would assume so. I have no specific recollection as
to what this refers to.

Q Does this not refer to work that was ongoing after
September 26, Mr. Frederiksen, on that very Flicker machine?

A I assume so. My only confusion is that it refers to a
production design rather than the prototype design that

exists in Flicker.

Q In the next paragraph it indicates:

"The system is completely debugged and ready for immediate production,"

correct?

A Yes.

Q That further indicates that there was debugging that took place after September 26 and prior to the time this letter was written, correct?

A Yes.

Q That would mean even as of October 18, the machine was not in the condition it was in on September 26 of that same year?

A I don't believe it says that.

It says additional debugging in preparation for production was accomplished, but that could have been on the additional printed circuit boards that we were working on or other hardware considerations as well.

I don't see where it specifically relates to the prototype debugging.

Q The next sentence says:

"The ultimate test, in my mind, the system can withstand a one-inch spark from a static generator." You testified that that spark testing had been done prior to September 26, 1974, didn't you, Mr. Frederiksen?

A Yes.

Q Why would it be mentioned at this time as having occurred in the interim between September 26 and October 18?

MR. TONE: I will object to that. I don't think the letter says that, your Honor.

I object to the form of the question, which would require him to accept Mr. Lynch's interpretation.

BY MR. LYNCH:

Q Let me suggest to you, Mr. Frederiksen, that the letter reflects a test that occurred in that interim period, is that correct?

A I don't know.

Q You don't know.

A It doesn't say that.

Q Down in the fourth paragraph it does say something, Mr. Frederiksen. It says:

"We have tuned the Flicker game to perfection. In our humble opinion the action is superior to the original."

So some work had been done on the Flicker game, correct?

A I don't recall.

Q In some respects this letter indicates the Flicker game was different on October 18 than it was on September 26, correct?

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I don't recall.

Q

You have no recollection of that?

A

No, sir.

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1 Q Then let's get to the software, Mr. Frederiksen.

2 (Brief interruption.)

3 BY MR. LYNCH:

4 Q Now, the software, Mr. Frederiksen, appears in Exhibit
5 436, correct?

6 A Yes.

7 Q This is the software, also, that appears in the patent
8 file, correct?

9 A I believe so.

10 Q Now, Mr. Frederiksen, that software listing, 436, is
11 dated in the first two lines, "Main program, Bally Flicker
12 pinball programmer, J.E. Frederiksen, 10/22/74."

13 Now, it was your testimony, Mr. Frederiksen, was
14 it not, that the software in 436 was the software in the
15 Flicker game, correct?

16 A Yes.

17 Q But then we have had curative testimony indicating that
18 there were several changes made, correct?

19 A Yes.

20 Q And that those changes were in the nature of de-bugging
21 436, correct?

22 A Yes.

23 Q In the de-bugged state, 436 bears a date of 10/22/74,
24 correct?

25 A yes.

1 THE COURT: Where is that?

2 MR. LYNCH: It is here, your Honor, in the text.

3 THE COURT: Oh, yes, thank you.

4 MR. LYNCH: The end of the second line, your Honor.

5 MR. TONE: May I have the last question and answer
6 read, your Honor?

7 THE COURT: Yes.

8 (Record read by the reporter.)

9 MR. TONE: In the debugged state, can you --

10 MR. LYNCH: I am sorry, in the non-debugged state.

11 MR. TONE: Thank you. I --

12 MR. LYNCH: Thank you, Mr. Tone.

13 MR. TONE: All right.

14 BY MR. LYNCH:

15 Q My question was in this non-debugged state, as it
16 exists in 436, it still bears the date of 10/22/74, correct?

17 A Yes.

18 Q Now, Mr. Frederiksen, the first error or difficulty
19 that exists in the Flicker program exists at Line 27, correct?

20 A Yes.

21 Q That is the jump conditional to main, correct?

22 A Yes.

23 Q You explained that to the Court.

24 (Brief interruption.)

25 BY MR. LYNCH:

1 Q

Exhibit 468 --

2 MR. GOLDENBERG: No, that is not it.

3 BY MR. LYNCH:

4 Q

Exhibit 468 was prepared by Dr. Schoeffler, and he
5 testified that the reason this instruction was illegal is
6 that it is a conditional jump, correct, off the ROM on which
7 the origination of the jump begins, if that --

8 MR. TONE: Your Honor, excuse me a minute. May I confer,
9 your Honor?

10 THE COURT: Yes.

11 (Brief interruption.)

12 BY MR. LYNCH:

13 Q Whether Dr. Schoeffler --

14 MR. TONE: Mr. Schnayer reminds me, Mr. Lynch, that
15 Dr. Schoeffler did not testify about that document.

16 MR. LYNCH: I will not refer to it again.

17 MR. TONE: All right.

18 BY MR. LYNCH:

19 Q So that we understand, this is a jump conditional
20 instruction, which means that the computer is supposed to go
21 from here to somewhere else if it senses a certain condition,
22 correct?

23 A Yes.

24 Q A conditional jump cannot be made off the same ROM,
25 correct, Mr. Frederiksen?

1 A. That is correct.

2 Q. In other words, if one wants to have a conditional jump,
3 the jump has to be within the same memory space on the chip
4 where the jump originates?

5 A. That is correct.

6 Q. When you have four ROMs, that means you cannot make a
7 conditional jump from ROM to ROM, correct?

8 A. That is correct.

9 Q. However, there are instructions, unconditional jumps,
10 that will allow you to jump from ROM to ROM, correct?

11 A. Yes.

12 Q. So you had a situation here where instruction 27 had a
13 conditional jump to interrupt plus 5, and interrupt plus 5
14 means you would jump to a place where the interrupt routine
15 began plus 5 places more, correct?

16 A. That is correct.

17 Q. That jump to interrupt plus 5 wound up being too far
18 away off the ROM, correct?

19 A. Yes, sir.

20 Q. Now, Mr. Frederiksen, the fact of the matter is is that
21 436 is a program that will not fit in 3 ROMs, will it?

22 A. No, sir. It will not.

23 Q. So this program, 436, would not physically fit in the
24 Flicker machine if it was only 3 ROMs or 3 E-PROMs, correct?

25 A. Yes, sir.

1 Q There is in fact another error on that program, is
2 there not, which, if we were talking about off-page refer-
3 ences not assembling, would cause that not to assemble?

4 THE WITNESS: Could you repeat the question, please

5 (Question read.)

6 BY MR. LYNCH:

7 Q I call your attention to Instruction 348.

8 A Yes, that instruction would not assemble.

9 Q That instruction would not assemble.

10 A It assembled, but it would not make it to main, if it
11 tried to.

12 Q So your testimony is that it would assemble the in-
13 struction, but if one tried to run the program, the program
14 would absolutely refuse to run when it got to either instruc-
15 tion 27 or the second instruction, 348, correct?

16 A Yes.

17 Q And so as such, the program was not operative in that
18 condition as it appears in 436, correct?

19 A No.

20 THE COURT: No, that's not correct?

21 THE WITNESS: It is not operative in its assembled
22 form from this program. This English program is still very
23 explicit as to what it intends.

24 BY MR. LYNCH:

25 Q I understand that. But the machine can't do anything
with it until it's corrected, correct?
A. That's true.

1 Q Now, tell me something else, Mr. Frederiksen. If you
2 took 436 and tried to assemble this program, what would
3 happen?

4 A It wouldn't execute

5 Q For the purposes of the Court's understanding, to
6 assemble the program means to run this program language
7 through a machine so that we generate that huge matrix of
8 0's, 1's and figures in hexadecimal code that are actually
9 in the ROMs, correct?

10 A Yes, sir.

11 Q So if somebody said to the computer, "Take these
12 instructions and assemble them so that the very information
13 that's in the ROMs can be accumulated," the assembler would
14 say, "I can't execute this." Correct?

15 A No. As a matter of fact, the assembler did execute it.
16 That wasn't the problem.

17 The problem is that the assembler was very
18 dumb and it wouldn't catch errors of that nature, and allowed
19 the execution in spite of the fact that they were in error,
20 of the assembler.

21 THE COURT: Excuse me. What is an assembler.

22 MR. LYNCH: An assembler, your Honor, is a device
23 that takes those instructions in that form and translates
24 them into the form such as shown in 473.

25 Your Honor, if I have another copy of 473

1 for the witness --

2 THE COURT: I have one myself here somewhere.

3 okay, I have the general idea.

4 MR. LYNCH: If we can give that to the witness --

5 MR. HARDING: John -- (Handing document.)

6 BY MR. LYNCH:

7 Q I do not represent to you that this is the same code as
8 derived from 436. In fact, you will recall that this code of
9 473 was what was dumped from the Flicker. It's signed by
10 Mr. Vacroux.

11 However, for purposes of the Court's under-
12 standing -- for purposes of the Court's understanding, an
13 assembler is a device that enables one to translate from the
14 listing as it appears in 436 to a code that actually goes in
15 the ROM, such as on 473, correct?

16 A Yes.

17 Q Now, if the assembler --

18 THE COURT: That is done in the machine or before
19 going into the machine?

20 MR. LYNCH: That's what the assembler machine
21 does.

22 BY MR. LYNCH:

23 Q Isn't that correct?

24 A The assembler is actually a paper tape program that's
25 loaded into the Intellec 4 developmental system.

Frederiksen - cross

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And then once that's loaded in, it will take the English and convert it to the numbers, so I can blast a PROM.

Q Now, you indicated that that assembler was not a very smart assembler.

A No. It wasn't in those days.

1 Q I show you the Intel Manual, Exhibit 1-A, Mr. Frederik-
2 sen, and under Appendix F, "SIM 4 Hardware Assembler," et
3 cetera, it indicates that the diagnostics will flag errors
4 such as unrecognized instruction mnemonics, unidentified
5 names, and off-page references.

6
7 Now, is not this jump conditional to interrupt
8 plus 5 an off-page reference?

9 A Yes.

10 Q Isn't it a fact that if you tried to assemble this pro-
11 gram, the assembler would, at the end, indicate to you
12 through its diagnostics that there was an error at line 27?

13 A I don't believe so.

14 Q Did not your assembler work in accordance with the
15 assembly indicated in the Intel Manual?

16 A No.

17 Q It did not.

18 What was your assembler and disassembler?

19 A It was submitted in the paper tapes that you received.

20 Q Where did you derive that assembly program?

21 A It came with the Intellec 4 machine.

22 Q It came with the Intellec 4 machine.

23 What you're saying, that assembler would not diag-
24 nose this basic error?

25 A I don't recall it flagging these errors, I really don't.
The program did fully assemble.

1 Q Now, we indicated that the program 436 would not even fit
2 onto 3 PROMs. How much space is there on each of the PROMs
3 of the type in the Flicker machine, Mr. Frederiksen?

4 A 256 bytes of instruction.

5 Q 256, which means if you had one PROM, you would have 256
6 bytes worth of memory. If you had two, it would be 512. If
7 you had three, it would be 768, and if you had four, it would
8 be 1,024 bytes of memory, correct?

9 A Yes, sir.

10 Q How many bytes are required in the program 436?

11 A 863.

12 Q So that would be, by that calculation that I have just
13 done, more than three and less than four, correct?

14 A Yes, sir.

15 Q Let's talk about how the software was developed, Mr.
16 Frederiksen.

17 You couldn't, it wouldn't seem to me, be able to
18 write a program like this just sitting down. You had to have
19 some work notes, some papers, some things of that nature,
20 correct?

21 A Yes.

22 Q I show you what has been marked as Exhibit 2-S, Mr.
23 Frederiksen.

24 Exhibit 2-S has some software notes in it, isn't
25 that correct?

1 A Yes, it is correct.

2 MR. TONE: Is 2-S the one that starts with Production
3 No. 34-

4 MR. LYNCH: It is the original. That is the original
5 that contained 340, 341, and 342, and, your Honor, I will
6 have copies of each of them for you in just a second.

7 (Brief interruption.)

8 BY MR. LYNCH:

9 Q Mr. Frederiksen, there are three sets of notations in
10 Exhibit 2-S. What is Exhibit 2-S?

11 A It is one of my notebooks from those days.

12 Q Early in the book, marked on the first page with the
13 number 340 with a Bates stamp, there is an accumulation of
14 notes, software notes, correct?

15 (Indicating), software notes bearing on the first
16 page 340, correct?

17 A Yes.

18 Q Then if we go beyond the tab, we come to a second set
19 of software notes, 341, correct?

20 A Yes.

21 Q If we go beyond two tabs, we come to a third set of
22 software notes, 342, is that correct?

23 A Yes.

24 Q Then I believe the remainder of the book is empty,
25 correct?

1 A. Yes.

2 Q. Mr. Frederiksen, what is the software notations represent-
3 ed by the series of documents 340, which I have now marked as
4 Exhibit 2-S-1?

5 A. They were some pinball sub-routines.

6 Q. What appears at 340 in the first segregated section of
7 the book, before the first tab, involve pinball sub-routines?

8 A. Yes.

9 Q. In the next adjacent section of the book appears 341,
10 which I have marked as Exhibit 2-S-2, and what appears at that
11 location, Mr. Frederiksen?

12 A. Wierd Animal Kingdom.

13 Q. Those are notations of software for a different gun game
14 being made by Dave Nutting Associates called Wierd Animal
15 Kingdom, correct?

16 A. Yes.

17 Q. Those notations, the second set of notations, are dated,
18 aren't they, Mr. Frederiksen?

19 A. Yes.

20 Q. What is the date that they bear, these second set of
21 notations, in the next adjacent section of your notebook?

22 A. 11-19-74.

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1 Q Fine.

2 Now, turn one more time to the next section of
3 the book.

4 The next section of the book contains what?

5 A Well, the next section is empty, but the section after
6 that is 342.

7 Q Apparently, if there existed pages between the next
8 two dividers, they have been removed or ripped out, correct?

9 A Yes.

10 Q So the next section that appears in the book where nota-
11 tions could be made is document bearing 342 on its first page,
12 which I have marked as 2S3, correct?

13 A Yes.

14 Q Now, Mr. Frederiksen, what is Document 342?

15 A These are more pinball routines.

16 Q I suggest to you, Mr. Frederiksen, that the routines on
17 342 bear a very close resemblance to many of the routines
18 on 436. Can you recognize that?

19 A Did you want me to go through and check that?

20 Q Well, check for me, if you will, Mr. Frederiksen.

21 You can check routines such as decrement credit,
22 sequential lamp, coin, extra ball, slam, tilt, and the out-
23 hole routine, among others.

24 (Brief interruption)

1 BY THE WITNESS:

2 A The decrement sub-routine is very similar, identical.
3 I believe it is identical.

4 I have no reason to believe they should not be
5 similar.

6 Q Fine, Mr. Frederiksen.

7 Now, the number of notations that appear in 342,
8 they are a great deal longer, are they not? There is a great
9 deal more instructions in the 342 section than there are in
10 the 340 section, isn't that correct?

11 A Yes, that is correct.

12 Q Now, I would like you to turn to the 340 section.

13 It appears to me, Mr. Frederiksen, that the 340
14 section contains a number of sub-routines including in them
15 a mux sub-routine or a multiplexing sub-routine, a clear
16 sub-routine, or sub-routine labeled clear, a sub-routine
17 labeled fill, a sub-routine labeled switch, a sub-routine
18 labeled main, a sub-routine labeled add, and a game sub-
19 routine.

20 I would like you to focus on the game sub-routine,
21 Mr. Frederiksen.

22 Now, that game sub-routine, Mr. Frederiksen, I
23 would like you to inspect that and tell me, if you can, Mr.
24 Frederiksen, whether that game sub-routine has the where-
25 withal in it to score 1000s and 100s in the Flicker machine.

1 A There are comments that suggest a 100 point score and
2 a 1,000 point score.

3 Q But confirm for me, Mr. Frederiksen, that there are no
4 software provisions in 340, the very first appearing listing,
5 for scoring 10s or for scoring a spinner or for scoring
6 bonus points on the machine?

7 A At a cursory glance, I see no comments suggesting that.

8 Q Now, I call your attention to the fact that there are
9 no spinner routines, bonus routines, or 10 routines in the
10 342 accumulation of the software, either.

11 A I do not see any comments relating to that.

12 Q Now, if you go to 436, the document that supposedly con-
13 tained the Flicker program on September 26, can you confirm
14 for me, Mr. Frederiksen, that there is a 10s routine, a bonus
15 routine, and a spinner routine dated some time in September,
16 1974?

17 A There is a spinner routine dated 9/15/74.

18 There is a bonus routine dated 9/11/74.

19 There is a 10s routine dated 9/12/74.
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Frederiksen - cross

1 Q Now also, Mr. Frederiksen, there is in the 436 printout
2 of the Flicker game what supposedly was the Flicker game when
3 it went to the Patent Office. There is a switch routine and
4 an interrupt routine, is that correct?

5 A Yes, that is correct.

6 Q The interrupt routine in 436, Mr. Frederiksen, is dated,
7 is it not?

8 A Yes.

9 Q I want you to compare that dated switch and interrupt
10 routine as they appear in 436 with the switch routine as it
11 appears in the first section of your notebook, that is, in
12 what is 2-S-1, the document beginning 340.

13 (Brief interruption.)

14 BY THE WITNESS:

15 A There are some similarities.

16 BY MR. LYNCH:

17 Q They are similar, are they not?

18 A Yes.

19 Q Mr. Frederiksen, I suggest to you that on September 26,
20 1974, the Flicker machine had three ROMs, and I suggest to you
21 that the program in that machine was the program on Exhibit
22 2-S-1, 340, the document beginning 340, and coupled with the
23 bonus 10s and spinner routines that are dated on 436, is that
24 correct, Mr. Frederiksen?

25 A I don't believe so.

1 Q It is a fact that that amount of code could fit in 3
2 ROMs, isn't that correct?

3 A I wouldn't have any way of knowing without an assembly.

4 Q The amount of code on the 7 pages of 340, plus the
5 spinner routine, the bonus routine, and the 10s routine, that
6 would fit on three ROMs, wouldn't it, Mr. Frederiksen?
7 You can tell by looking at it.

8 A I couldn't tell you. It may fit on two.

9 Q Let me ask you this, Mr. Frederiksen. Isn't it a fact
10 that the reason that you were able to assemble the program
11 the first time on September 26, or thereabouts, 1974 was
12 because the program was shorter and the jump called for by
13 the jump to interrupt plus 5 was closer to the place where
14 the instruction called for a jump to?

15 A That was probably true sometime in the development.

16 Q I call your attention, Mr. Frederiksen, to Page 6, the
17 sixth page of the Exhibit 2-S-1. Near the bottom of the sixth
18 page on 2-S-1 there is an instruction, is there not, "Jump
19 conditional to switch plus 5"?

20 A Yes.

21 Q That jump conditional to switch plus 5, Mr. Frederiksen,
22 as it appears on the sixth page of 2-S-1, is an instruction
23 that performs the same function, does it not, as the jump to
24 interrupt plus 5 at Line 27 of Exhibit 436?

25 A I don't understand that question.

1 Q If you trace the function of that, if you go to switch
2 and go to 5, you will find you wind up getting referred to the
3 table.

4 Confirm that for me, Mr. Frederiksen, in Exhibit
5 2-S-1, that is, the first set of documents. If you go to
6 the switch routine plus 5, I believe you will find that you
7 wind up being referred to the table.

8 A Yes.

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Frederiksen - cross

1 Q And that is also what happens in 436, the attempted
2 instruction where it says "jump to conditional to interrupt
3 plus five," jumps you to an instruction which winds up
4 referring you to the table, correct?

5 A I'm sorry, I'm getting a little lost.

6 What routine in the main program?

7 Q 436, line 27.

8 A Line 27.

9 Q Line 27 is jump conditional to interrupt plus five,
10 correct?

11 A Yes, that is correct.

12 Q Now, that jump, if we follow what it does, it does the
13 same thing to the jump conditional to switch plus five. Isn't
14 that correct?

15 A Yes, that is correct.

16 Q Now, I suggest to you, Mr. Frederiksen, that what
17 happened is that at some later time, after September 26, 1974,
18 you added the additional instructions that appear in your
19 book, after the Weird Animal Kingdom instructions dated in
20 November;

21 I suggest that as a result of that, the
22 two instructions became too separated to have a valid
23 assembly; and I suggest to you, Mr. Frederiksen, that on
24 September 26 the Flicker game had as its program funda-
25 mentally what exists in Exhibit 340 -- I mean document 340,

1 Exhibit 2-S-1, plus the spinner, 10's and bonus routines,
2 and perhaps a little more. But basically that.

3 Isn't that correct, Mr. Frederiksen?

4 A This particular book was something that I built myself
5 out of some school papers.

6 I was going to class at the time, as you
7 notice in the front of the book, it refers to University of
8 Wisconsin, Milwaukee, some college engineering curriculum
9 that I was taking.

10 I discovered I -- I was kind of new to office
11 supplies -- I discovered that you could punch holes with this
12 new, fancy machine that they had and spiral bind things. And
13 so I had a lot of fun making my own spiral notebook.

14 But I did, in the process of doing that,
15 make the different sizes of these things, of these different
16 sections, match what I needed for my classes at that time.

17 The pinball started in a relatively thin
18 section. And I went to one of the fatter sections at the
19 back when I continued the pinball stuff.

20 It does not relate to that date on Weird
21 Animal Kingdom at all. As a matter of fact, I did not even
22 get on to Weird Animal Kingdom until after I was well done
23 with the pinball project.

24 So that obviously would not make any sense
25 at all.

Also, the handwritten notes were done far before I ever started really getting the yellow paper copies like the type submitted to the Patent Office that I could annotate on directly.

Once I received hard copies I could annotate on, I pretty much didn't use the notebook any more, and just started using the yellow copies. They were much easier to do, of course, and much prettier to look at than my handwriting. And I continued on with those.

The program that existed in the Flicker is essentially the one that exists there today, at the date of the demonstration. All these changes were in there at that time, to the best of my recollection.

Q Let me -- is your testimony, Mr. Frederiksen, that what begins in the first section is carried over into this third section of the book?

A That is absolutely correct, because of the thickness of the different sections that I constructed in my notebook.

Q Let me ask you to compare, Mr. Frederiksen, the clear routine or the fill routine.

There's a fill routine in the first section, and I ask you to confirm that there's a changed fill routine in the second section of the book -- the third section.

That is, there's a fill routine in Exhibit 2-S-1, and a changed fill routine in 2-S-3. There's also a

Frederiksen - cross

1 clear routine in 2-S-1, and a changed clear routine in
2 2-S-3.

3 Isn't that correct?

4 A Well, I have no reason to disbelieve that, and it would
5 do nothing more than just simply track some of my thought
6 patterns in those early days.

7 Q Isn't it the case, Mr. Frederiksen, that nowhere in
8 that book do you find a bonus routine, a 10's routine, or a
9 spinner?

10 A I have no doubt that that also would be true, since,
11 as I mentioned to you, the continuation of the program to the
12 demonstration date was done on yellow paper, not done in the
13 notebook at all. The notebook was my beginnings of this
14 project.

15 Q Let me ask you this, Mr. Frederiksen. 436 that
16 supposedly contains the software that was in the Flicker on
17 September 26 is dated in October. Correct?

18 A Yes.

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1 Q The letter from Mr. Nutting to Bally indicates that
2 debugging and tuning went on during that period, isn't that
3 correct?

4 A It states debugging, but it does not refer to whether it
5 was software or hardware, that is correct.

6 Q But something was done, software or hardware, wasn't it,
7 Mr. Frederiksen?

8 A We had continued working on the printed circuit boards
9 after we had made our demonstration to Bally. We have already
10 stated that.

11 Q Mr. Frederiksen, I suggest to you that the assembly,
12 when it finally took place, on that machine was a valid
13 assembly because -- well, strike that.

14 If, indeed, the instructions of jump conditional
15 were not separated by so much that it would be off the ROM,
16 the machine would work, correct?

17 If a jump conditional instruction does not take one
18 off the ROM, it can be made, correct?

19 A That is correct.

20 Q I suggest to you that it is a problem for a programmer,
21 when he is inserting extra software, sometimes he inserts
22 software between two conditions and winds up pushing the
23 landing spot for a jump condition onto another ROM, correct?

24 A Yes.

25 Q Now, I suggest to you that there is a lot less software

1 in 340 than there is in 342, isn't that correct?

2 A Yes.

3 Q I also suggest to you, Mr. Frederiksen, that there is
4 a mux, an interrupt routine, that appears in 340 that is
5 dated in September, like September 12th or thereabouts, 1974.

6 When I say 340, I mean Figure 2S1.

7 What I wanted you to confirm is that in 340, Mr.
8 Frederiksen, there is a switch, an interrupt routine, that
9 in 436 there is a date of 9/11/74.

10 The interrupt switch routine bears a date of
11 9/11/74.

12 Your Honor, there appears on the third page of
13 436 near the bottom, that interrupt switch routine.

14 (Brief interruption)

15 BY THE WITNESS:

16 A I cannot find the interrupt routine in the 340.

17 BY MR. LYNCH:

18 Q In 340, it is just called switch. I believe you con-
19 firmed that earlier.

20 THE COURT: Can you refer him to the page?

21 MR. LYNCH: The fourth page.

22 BY THE WITNESS:

23 A We had only talked about the upper piece, but in regards
24 to the upper piece, that is true, that they are similar, and
25 it is dated as you mentioned.

Q Doesn't that indicate, Mr. Frederiksen, that the notations that you made in Exhibit 340 were made on or about November 11, 1974?

A I do not understand.

Q Well, you dated the routine, when it appears in 436, as September 11, 1974.

Wouldn't that indicate that that was the date on which you first prepared that routine?

THE COURT: Your earlier question, I think, said November.

MR. LYNCH: I meant September, your Honor. I am sorry.

BY THE WITNESS:

A The switch routine is an earlier version. It could be substantially earlier. There is no necessary correlation as to the final version, which is now called interrupt on 9/11/74, as far as time.

So I am a little confused by what you are trying to draw a conclusion on.

BY MR. LYNCH:

Q The interrupt routine that appears on 436 and dated finds correspondence in the routine in Exhibit 2S1, correct?

A Yes, it does, in some aspects.

Q Well, I am asking you if that indicates to you that the routine on 2S1, the document marked 340, was developed in

1 or around September 11, 1974.

2 A It suggests that it was done earlier.

3 Q But you do not know when it was done, correct?

4 A The first pages were done very early in the project.

1 Q Now, Mr. Frederiksen, it remains the fact that Exhibit
2 436, the erroneous program that was originally testified by
3 You to have been in Flicker, bears the date of October 22,
4 1974, correct?

5 A Yes.

6 Q It is your testimony that despite the fact that the only
7 printed evidence of that bears a date in October, that that
8 was in the machine as of September '74, correct?

9 A Yes.

10 Q Mr. Frederiksen, I would like --

11 THE COURT: What does the October date signify?

12 THE WITNESS: Your Honor, I really don't have any
13 recollection of it. You know, I have been asked that question,
14 and my only guesses were that I added the labeling subsequent
15 to that for some purpose which I just don't recall at this
16 time since the labeling was something I could have just
17 placed in.

18 THE COURT: What was your purpose in putting a date on
19 anything to begin with?

20 THE WITNESS: Although I guess not many people recollect
21 it, but if anyone else recollects, I have some recollection
22 that we had sent the machine to Bally for their evaluation
23 and that was about a month or three weeks after the demon-
24 stration. It might have been that this was just an affirma-
25 tion of all the paper work in conjunction with that machine

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1 before I sent it out, but I really don't want to emphasize it.
2 It is really just a surmise at this time. I really don't have
3 any direct recollection.

4 THE COURT: Does a date on a computer program have any
5 conventional meaning in the computer programming business?

6 THE WITNESS: In those days hardware designers who were
7 getting into microprocessors were not aware that they were in
8 the computer programming business. It was very early. Today,
9 of course, the computers are very smart. They have clocks.
10 They print out the time that you actually do listings and
11 things and documentation is much more obvious today.

12 In those days everything that was put on this paper
13 tape, we had to splice in ourselves, and sometimes that was
14 done before; sometimes it was done in conjunction with pieces
15 of the routine. That is why some of the routines carry dates
16 because I had little pieces of paper tape that I spliced
17 together to make larger programs out of.

18 This whole title piece could have been added as a
19 particular piece of documentation at that particular time
20 for some historical reason that I had in mind at that time.

21 I have no doubt I did it. I just don't recall why
22 for this particular time.

23 THE COURT: It is my impression that when people are in
24 the process of inventing things or in the process of preparing
25 things that they think they may later claim as inventions.

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1 that dates are usually intended to signify the date of con-
2 ception or the date of reduction to the particular form that
3 the document or other item may have been first prepared.

4 Does that make sense to you as what was your
5 intent at the time you put the date on there?

6 THE WITNESS: Well, I might have thought that to be
7 true, except for the fact that the errors, like on 27 and 29,
8 on instructions 27 and 29, were obviously in this program,
9 and this is obviously the last English copy I had of this
10 program before I did the final patches that were in the demon-
11 stration; but I really did make those patches and made that
12 demonstration on that date and this is the last English copy
13 that I had before those final patches. So it is very clear
14 that this program existed intact before the date of October
15 22.

16 That is why I am having a hard time going back and
17 correlating where the date of October 22 has significance now.

18 BY MR. LYNCH:

19 Q It is the case --

20 MR. LYNCH: May it please the Court, may I continue?

21 THE COURT: Yes, go ahead.

22 BY MR. LYNCH:

23 Q It is the case also, Mr. Frederiksen, that the date on
24 that program, 10-22-74, is three days earlier than a date that
25 appears on the fourth ROM in the Flicker, correct?

1 , 4 1 A. Yes, sir.

2 Q It is also the case that both of those dates are a
3 week or approximately a week after the letter, Exhibit 2-K,
4 correct?

5 A. I believe so.

6 Q It indicates here in Exhibit 2-K:

7 "We will have the second generation design
8 completed and running by the end of next week."

9 What was that referring to, Mr. Frederiksen?

10 A. I don't have any specific recollection. It probably was
11 referring to the printed circuit boards we were working on.

12 Q The printed circuit boards are referred to elsewhere in
13 the document. It says:

14 "We have prepared final artwork for the
15 interconnect board (mother board)."

16 To what is referred by the second generation design
17 to be completed and running the week after October 18?

18 A. This seems to be referring to a production type computer.
19 We never built a production type computer, so it may have been
20 indicating what Dave Nutting was wishing to pursue if they had
21 intended to pursue.

22 I just don't have any recollection at this time.
23 We never built a production computer. We built the prototype
24 computer.
25

1 Q I'm referring to second generation design. There was
2 apparently a second generation design under way at that time,
3 was there not, Mr. Frederiksen?

4 A There were printed circuit copies that were under way
5 at that time, but again, I don't have any recollection as
6 actually building a production type computer.

7 Q Your testimony is, you don't know what Mr. Nutting was
8 referring to. Is that right?

9 A It appears as though he is referring to the printed
10 circuit boards.

11 I don't have any recollection of building a produc-
12 tion printed circuit board.

13 Q The printed circuit board is referred to in the fourth
14 paragraph, Mr. Nutting; I want to know what the second gener-
15 ation design in the fifth paragraph is.

16 A Well, the whole fifth paragraph reads:

17 "We will have a second generation design completed
18 and running by the end of next week. Production
19 type computer, new mother board, and new, enlarged".
20 I think that's mistyped in there -- "readouts."
21 And that's -- I don't see how you're separating
22 those.

23 We did not build a production type computer. We
24 were not encouraged to go any further.

25 Q But it's your testimony that none of all of this work

1 referred to by Mr. Nutting found its way into changes in
2 the Flicker machine. Is that your testimony?

3 A Yes, sir. It's the best of my recollection.

4 The only thing that's in the Flicker is the proto-
5 type computer. The production PC boards and what not, even
6 though we built those, those are not the ones that are in
7 the machine at this time.

8 Q I show you, Mr. Frederiksen, what I will mark as Ex-
9 hibit 2-T, Defendant's Exhibit 2-T, a document which appears
10 at the top very similar to Exhibit 436.

11 Can you tell me what Exhibit 2-T is, Mr. Fred-
12 eriksen?

13 A At a cursory glance, it appears to be a copy of the
14 436 printed out later on a regular printer rather than a
15 teletype machine.

16 Q Is it not the case also, Mr. Frederiksen, that there are
17 missing instructions at the breaks that appear in Exhibit 2-T?

18 A Oh, excuse me. Which one is missing instructions?

19 Q It appears -- I don't have a copy myself, Mr. Frederik-
20 sen -- but it appears, for example, that instruction, I be-
21 lieve 29, is missing.

22 And then there are other instructions missing at
23 those portions in the listing 2-T at which you see a space.
24 Most of those spaces there are instructions missing.

25 A Yes, I see where the instructions are missing.

1 Q That indicates to me, and tell me if I'm wrong, Mr.
2 Frederiksen, that 2-T is a working copy, it's some type of
3 a copy generated for you to test, work on, or involve your-
4 self with perhaps changes to the program.

5 A If that were true, it would seem to me that the follow-
6 ing instructions would not have the different -- or the con-
7 tinuing address as is shown on 436.

8 For example, switch starts at -- the exchange zero
9 on switch, for example, is at 32 still.

10 Down by decrement, that's still at 52.

11 So it appears as though those instructions for
12 some reason just didn't make it to the printout, for some--
13 you know, for some reason they just didn't make it out.

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1 Q Let me suggest to you that what you see on 2-T,
2 Mr. Frederiksen, is, you don't see line 29, and then you
3 don't see line 31, except past the first slash mark.

4 A That is correct, implying the printer was having some
5 problems getting it all printed out.

6 That's all. It was just a printer problem.
7 So I'm not sure what you're leading at here.

8 Q Either that, or perhaps you were editing the tape or
9 splicing the tape. Isn't that correct?

10 A No, I don't believe that to be the case. It looks to
11 me like it was a printer problem.

12 Q But if you -- the printer problem occurring all the way
13 down the entire device, the entire listing?

14 A Yes, I believe that to be true.

15 Let's take a look at this. On ROM instruction
16 32 there is -- the switch subroutine got out, but some of the
17 stuff before it didn't.

18 And there's other instances, for example,
19 ROM instruction 32, where it's pretty clear the printer is
20 getting kind of scrambled.

21 This is not an uncommon --
22 Q The printer is getting scrambled, but confirm for me,
23 Mr. Frederiksen, the printer appeared to get scrambled at the
24 end of each subroutine.

25 A No, sir, that's not true. Instruction -- that's

Frederiksen - cross

2249

possibly true, I don't know.

Instruction 176 is another case of a scrambling. ROM instruction 258 there appears to be some kind of scramble which does not seem to be associated with the end of a subroutine.

Q At 258?

A At 258. It looks like the printer is just confused.

That was a new printer for me at the time, and it just couldn't keep up with apparently the printout that it was trying to keep up with. It just couldn't keep up with it.

What this copy is or where you got it I really have no recollection of it specifically, but it looks like simply a confused printer.

Q And it's your testimony that the breaks in there were not purposely created to isolate the subroutines one from another?

Turn to the end of it, Mr. Frederiksen, and confirm for me that, working backwards, that virtually every break occurs at the end of a subroutine in the last couple of pages.

A (No response.)

Q Isn't that the case, Mr. Frederiksen?

MR. TONE: Does the question refer only to the last couple of pages, Mr. Lynch?

1 MR. LYNCH: That will be satisfactory.

2 (Brief interruption.)

3 BY THE WITNESS:

4 A In most instances, it appears as though the skipping is
5 around the sub-routines. There are exceptions to that, as
6 mentioned, like in interrupt, but I tend to agree with you
7 that it seems to occur around the sub-routines.

8 MR. LYNCH: Now, may I, your Honor, exchange Exhibits 1,
9 12-T.

10 BY MR. LYNCH:

11 Q The original of 2-T, which has been dismembered in the
12 copy that you have already had, says, "Disk 4, File 1," in the
13 upper right-hand corner, does it not, Mr. Frederiksen?

14 A Yes.

15 Q That is in your handwriting, isn't it, sir?

16 A Yes, it is.

17 Q Now, what does, "Disk 4, File 1," mean?

18 THE COURT: I do not see that.

19 MR. LYNCH: Your Honor, you cannot see it on the original
20 because they made the holes on it.

21 If the Court will look up in the upper right-hand
22 corner, you see the remnants of it here.

23 THE COURT: Oh, I see.

24 MR. LYNCH: There it is. I am sorry. That is why I
25 needed this copy for the witness, your Honor.

1 BY THE WITNESS:

2 A. That is something that must have occurred sometime later
3 in conjunction with the floppy disk, in one of the floppy
4 disk drives that we had bought at a later date.

5 BY MR. LYNCH:

6 Q. The floppy disk drive you obtained, you testified in
7 your recent deposition, in 1975, correct?

8 A. I believe so.

9 Q. Now, this would indicate that you were still working on
10 the program in 1975?

11 A. I had mentioned that to you before we had made an attempt
12 to get a cleaner copy. This appears to be one of the earlier
13 attempts to get a clean copy for the patent attorney, and
14 this was an attempt to make the -- get the English onto a disk
15 instead of a paper tape.

16 I do not see anything more than that here.

17 Q. It does not indicate to you it is a work copy that
18 indicates that there was work going on in the program after
19 October 22nd, 1974?

20 A. Of course, it does, and I had mentioned to you why.

21 It was for a purpose of getting a clean copy for the
22 patent attorneys. I had to make some changes, such as end and
23 end game as ampersand DD, instead of add, such as an end
24 statement was required.

25 We talked about those things.

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1 This is apparently an attempt to get the paper tape,
2 a first attempt, one of the first attempts, to get the paper
3 tape onto a floppy disk, so I could do that type of work.

4 Q. But do you have any specific recollection as to what
5 Exhibit 2-T was?

6 A. No, I do not.

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1 Q Do you have any specific recollection why you separated
2 all the subroutines?

3 A My only feelings about it are that the printer was
4 having a problem.

5 Q Having a problem specifically at the ends of sub-
6 routines, is that your testimony?

7 A Yes, sir.

8 Q Let me ask you this, Mr. Frederiksen.

9 Now, you have testified about chips and the
10 software.

11 I want you to refer once again to the December
12 20th drawing by Mr. Smith made the day after all those other
13 drawings, which supposedly show the Flicker game.

14 Now, Mr. Frederiksen, what is shown in the
15 place of the units here that are 14050's on Exhibit 2-R?

16 A 14050's or 4050's, which is generically the same part.

17 Q So in Mr. Smith's drawing dated in December 1974 on
18 Exhibit 2-R, we still find 14050's or 4050's appearing on
19 the production computer, is that correct?

20 A Yes, sir.

21 Q Now, it is the fact, is it not, Mr. Frederiksen, that
22 at least two of those 14049's that were found in the Flicker
23 and that you said were changed prior to September 26th, 1974,
24 were parts that bore date codes of the 44th week of 1974,
25 isn't that correct?

1 A I do not know. I am sure that you have information
2 in that regard.

3 Q In the statement to the Court filed in this matter on
4 March 5th, I believe the statement was made at page 6:

5 "Two Motorola integrated circuits are coded
6 MC14049CP7444" -- that is in quotes -- "and were
7 apparently manufactured in the 44th week of 1974.
8 These integrated circuits are hex inverting
9 buffers, one of which is used on the test line."

10 That is referring to the chips marked 4 on
11 Exhibit 28-A, correct, Mr. Frederiksen?

12 A Yes.

13 Q It is the case that in Mr. Smith's drawing, December
14 20th drawing, he shows five 14050's or five 4050 chips,
15 correct?

16 A Yes.

17 Q I suggest to you, Mr. Frederiksen, that that change
18 had not been made yet in the Flicker device.

19 THE COURT: As of when?

20 MR. LYNCH: As of December 1974.

21 BY THE WITNESS:

22 A No, sir. That is not true.

23 I prefer to use the 4050. In the production
24 computer, I did not have any other auxiliary functions I had
25 to perform as in the prototype computer. So I could go back

and use the 4050.

The 4050 works fine. The 4049 in that drawing also works fine.

As I suggested to you, the changes were made in the debugging of the hardware in conjunction of bringing up the Flicker for its demonstration, and it was brought up. It was operational, and it was demonstrated.

1 BY MR. LYNCH:

2 Q Well, Mr. Frederiksen, my question is was it operating
3 with 14049s or 14050s?

4 Let me ask you this. Why would Mr. Smith have
5 put 14050s in the device if you had already made the decision
6 to change to 14049?

7 MR. TONE: By "in the device," does Mr. Lynch mean
8 in the drawing?

9 BY MR. LYNCH:

10 Q Why would he have put it in the drawing if you had
11 changed it in the device?

12 A As I just mentioned, the 14050 is preferred in the
13 simpler architecture of a production computer where there is
14 no E-PROMs that have to be mixed in with all the other com-
15 ponents to get a prototype machine.

16 The Bally Brain as implemented in the Flicker is a
17 prototype machine as opposed to a production machine. There
18 are production simplifications. This is just simply indi-
19 cating one of them.

20 There is a lot of hardware that is on that schem-
21 atic that is not shown on this schematic. This is an
22 attempt at a lower cost production and a simplification.

23 In that machine we needed the '49s anyway to use.
24 There are six parts of those in each chip. To use one or
25 two of them and just leave the rest of them dangle and then

Frederiksen - cross

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1 have to put another chip in to get a 14050, which could be
2 simulated with a pair of 14049s in series, would have been
3 a little silly.

4 So the technician just simply took it upon himself,
5 for example, in the case of reset parts on the upper left-
6 hand corner of that drawing, to use a pair of '049s in
7 series.

8 Now, that seems very reasonable to me for a proto-
9 type machine, and it still seems very reasonable to me that
10 the production machine would indicate the simpler imple-
11 mentation.

12 Q So your suggestion is that this was a decision that
13 Mr. Paul Smith made by himself?

14 A Most technicians will substitute NAND gates, NOR gates,
15 and all other inverting functions as they deem necessary
16 in the process of wiring, and Paul Smith did do that as
17 well.

18 I don't recall him specifically asking me about
19 each of these changes, but it is something that is function-
20 ally equivalent and a good technician is totally aware
21 of that.

22 Q So he just decided to make the change?

23 A I do recall in the instance up in the upper right-
24 hand corner in the test wire that I had to have an inverting
25 instruction to take the place of a second inverter that

1 might be required. I do not recall in the area of the
2 reset wire, though, that I gave him instructions to do that
3 explicitly, although I might have. I just don't recall that.

4 Q The drawings, the entire series of drawings being pre-
5 pared by 49, 50, 51, 52, 53 and Exhibit 2-R, from which you
6 are testifying, all prepared by Mr. Smith on December 19 or
7 December 20, 1947, what was the purpose of preparing those
8 drawings?

9 A I don't recall the explicit purpose. I assume it was
10 in preparation for production documentation.

11 Q Is it your testimony that the purpose of preparing 49,
12 50, 51, 52 and 53 was to reflect the Flicker machine as it
13 was in September 1974, but the purpose of Exhibit 2-R, pre-
14 pared by Mr. Smith the very next day, was to show some dif-
15 ferent device?

16 A The device is not functionally different. It is in
17 generality, but specifically it is different in the area
18 where there are ROMs versus E-PROMs.

19 Any time that I see a drawing containing a ROM, it
20 is referring to a production machine. If it contains E-PROMs,
21 it is referring to a prototyping machine.

22 We had never intended to use E-PROMs in production.
23 That was purely a prototyping convenience for the Flicker
24 prototype that is here today.
25

1 Q But it only contained three ROMs or it only contained
2 768 bits of memory, correct?

3 A The drawing shows three ROMs, not PROMS, with an exten-
4 tion bus in case additional code is required.

5 Now, you can add as many ROMs as you would like.
6 The code is extendable up to the maximum configuration of
7 the machine. I only needed to show three ROMs to implement
8 the hardware portion I was proposing for Flicker, so no
9 more than three was necessary from a hardware point of view
10 to demonstrate.

11 Q Let's go to Exhibit 52, Mr. Frederiksen. This is one of
12 a series of documents, correct?

13 A Yes, sir.

14 Q You testified and you made affidavit in the Patent Office
15 that Exhibit 52 shows the Flicker as it existed on September
16 26, 1974, correct?

17 A I believe so.

18 Q I have drawn a green outline on that document, which
19 generally the items within the green are items that would
20 appear on the mother board, correct?

21 A Yes.

22 Q Items that appear outside are items that are off the
23 mother board. In the instance of P2 and P1, those are cor-
24 rections from the mother board to the logic board, correct?

25 A I believe so.

Q I call to your attention, Mr. Frederiksen, that the

1 playfield inputs are indicated as going to P2 and thence
2 mux lines coming off the logic board through P2 to multiplex
3 the playfield; isn't that what is shown?

4 A Yes.

5 Q The lamps are shown coming off the P1; that is, a
6 multiplexing signal called mux drive comes on to the mother
7 board through P1. The mux signals are put through a tran-
8 sistor, which I believe was testified as being the low beta
9 transistor by Dr. Schoeffler, and connected to the various
10 lamps, to the playfield through P5, isn't that correct?

11 A Yes, sir.

12 Q That would indicate, would it not, Mr. Frederiksen,
13 that there is something driving the switches through con-
14 nector P2 out to the playfield through P4 through the
15 lines just called mux and there is a drive coming in through
16 P1 through the low beta transistors to the lamps, correct?

17 A Could you repeat the question, please?

18 Q I can repeat it, I believe.

19 Well, perhaps the court reporter ought better re-
20 peat it.

21 (Question read by the reporter.)
22
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1 BY THE WITNESS:

2 A I don't believe so. I think all that's being indicated
3 is that the mux -- may I?

4 THE COURT: Yes.

5 BY THE WITNESS:

6 A I believe that all it's indicating is that these mux
7 collectors are available into the computer, if for any reason
8 it needs it there.

9 I didn't use them, as I recall. But this mux here,
10 which should be the same wires as these mux, zero through F
11 here, and so therefore this point is hard wired to this point,
12 is hard wired to this point.

13 Q What you're saying is, on the mother board there appears
14 a wire between the collector of this transistor of the mux
15 zero line and the mux zero line at Pin 2 of Exhibit P-2,
16 correct?

17 A I don't recall explicitly. It appears that it's
18 indicating that.

19 My recollection is that the switches return directly
20 to the mux transistors, and that that would explain that.

21 Q That would indicate that this representation of the
22 mother board is in error. Isn't that correct?

23 A I don't understand that, since mux zero through F is
24 labeled clearly down there, mux zero through F is labeled
25 clearly up there.

1 Q I understand that, Mr. Frederiksen. But this indicates
2 that mux zero through F communicates with the logic board
3 through P-2 and with the -- and mux drive, zero through F
4 communicates with the logic board through P-1. Correct?

5 A No, sir. Mux drive zero through F goes to the mux
6 transistors, which then become labeled mux zero through F.

7 And I do believe that those signals are the same
8 as mux zero through F and P-2.

9 If you think that they're different, I don't know
10 what else to tell you. That's my best recollection.

11 Q The fact of the matter is that there is a connection,
12 is there not, between the collector of this transistor and
13 these switch inputs?

14 A I believe so.

15 Q And that isn't shown on Exhibit 52, is it?

16 A Yes, it is. I just explained that.

17 Q As a matter of fact, is there not a jumper wire going
18 from P-1 to P-2 on the mother board?

19 A There should be. And I think that this does label that
20 way.

21 THE COURT: Mr. Lynch, before we go on to the next
22 question, let's take a brief recess.

23 (Brief recess.)
24
25

ess. 1 MR. LYNCH: May it please the Court, your Honor.

2 BY MR. LYNCH:

3 Q Mr. Frederiksen, calling to your attention what appears
4 on Exhibit 52: Insofar as the diagram indicates, it indicates
5 that signals are coming off the logic board through P2 to
6 the playfield, correct?

7 A Yes.

8 Q And the arrows indicate that those mux zero to mux F
9 lines at P2 are coming from the logic board, correct?

10 A Yes.

11 Q They also indicate that the mux drive signals which are
12 similar signals through a driving transistor come through P1,
13 from the logic board. Correct?

14 A Yes.

15 Q And the arrows so indicate that there's such a signal,
16 correct?

17 A Yes.

18 Q Now, isn't it a fact that there is no such signal that
19 comes from the logic board through P2 to the playfield
20 switches?

21 A No.

22 Q Isn't it a fact that the signal comes through P1, there's
23 a jumper wire to the vicinity of P2, and thence they go to
24 the playfield switches?

25 A The switches are multiplexed into the array. Some of

1 the switches are shown going to the playfield.

2 Apparently this diagram allows for some switches
3 to be located in the computer proper itself.

4 As to whether or not the technician, this Paul
5 Smith who made this drawing, was aware of whether those
6 signals were coming or going, since the matrix can be con-
7 fusing -- it may mean that he placed the arrows backwards.

8 But it's pretty clear that the intention is to
9 allow for switch expansion into the computer zone itself if
10 that is required.

11 Q So it's your testimony that the arrows are the wrong
12 way up in P-1?

13 A It's a matter of convention. The matrix is kind of
14 difficult to understand which side is driving which.

15 I would suggest that they should be the other way around.

16 Q Let me ask you a question, Mr. Frederiksen: Isn't it
17 a fact that the arrangement shown on 52 is consistent with
18 an arrangement of the Flicker game where there would be two
19 matrixes, with two matrices?

20 A Absolutely not.

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Frederiksen - cross

Q Well, if, indeed, the switches were being driven through P2 to the playfield and the lamps being driven through P1, that could indicate the existence of two matrices, isn't that correct?

A I have no recollection or never any intention of any such dual matrix.

The technician, I do not think -- was creating his own here. I would believe that it is as I have told you.

Q Let me just ask you this.

There is an exhibit 54 which I believe you testified was a production computer you prepared very early in July or thereabouts, July or August?

A Yes.

Q Now, if implemented in a pinball game, isn't it a fact that the arrangement of Exhibit 54 would have two matrices?

(Brief interruption.)

BY THE WITNESS:

A I do not recall the specific intentions of this drawing.

It is a very large computer architecture. There is a lot of signals allowed for. I just do not recall offhand what they were allowed for.

Q Didn't you testify earlier in this case that you prepared that in the summer?

1 A Yes, I believe so. It was earlier.

2 Q Now, isn't it a fact that the architecture called for
3 in that exhibit is consistent with the two matrix Flicker
4 machines?

5 A I do not see that offhand.

6 Q There is a decoder. There are three decoders, are there
7 not?

8 A Yes.

9 Q One decoder could be used for the solenoids, one for
10 the lamps, and the third to drive the switches, correct?

11 A / No.

12 Q It does not show that, but it shows three decoders,
13 correct?

14 A Yes, but it would seem more reasonable to me that it
15 would allow for just simply a larger number of solenoids,
16 for example.

17 Q The resistors are on the decoders to drive the solenoids,
18 correct, in Exhibit 54?

19 A I do not recall.

20 Q Well, there are two decoders that show resistors on them,
21 correct?

22 A That is correct.

23 Q If you wanted to have decoders to the lamps and the
24 solenoids, it would be reasonable that they would have
25 resistors, correct?

1 A Yes.

2 Q If you had a separate decoder multiplexing the switches
3 or switch matrix, it would be reasonable that that decoder
4 would have no resistors such as the third decoder on
5 Exhibit 54, correct?

6 A It depends upon whether or not the output structure,
7 the emitters, follow or not. The emitter follower configura-
8 tions do not require current limiting resistors.

9 Q But it is consistent with a view that that third de-
10 coder could be used to operate switches, correct?

11 A I never had any intentions of having a separate switch
12 matrix, and I never recall making any drawings to reflect
13 that.

14 My estimation of what this is is an exten-
15 sion of one of the other existing capacities such as
16 solenoids.

17 Q You did make this drawing, did you not?

18 A Yes.

19 Q Now, as another matter, Mr. Frederiksen, did you put
20 diodes in the matrix of the playfield switches in the Flicker
21 game?

22 A In some instances, yes.

23 Q In the matrix of the playfield switches?

24 A Yes.

25 Q Which ones?

1 A They all contain diodes somewhere, whether in
2 individual or in common, but by matrix, I assume you mean
3 the entire electrical matrix, and they must exist somewhere.

1 Q Let me ask you this, Mr. Frederiksen. Do diodes exist
2 individually on the playfield switches of the Flicker game?

3 A In some instances, yes; in other instances they exist
4 in common.

5 Q Isn't it a fact that diodes exist on the columns? There
6 is one diode on each column of switches in the playfield of
7 the Flicker game, correct?

8 A I don't recall explicitly, but it is true in some of the
9 cases.

10 Q Isn't it true with the arrangement as it exists in the
11 Flicker game that the sneak paths could occur on the playfield
12 of the Flicker game if there were a stuck switch?

13 A Yes, sir.

14 Q So your testimony on 341, where I ask, "You had to put
15 diodes in the matrix. That was to avoid these sneak
16 electrical paths at least," you answered "Yes," the diodes in
17 fact on the playfield matrix of Flicker do not avoid sneak
18 electrical paths, do they, Mr. Frederiksen?

19 A I am not sure what I understand that is an excerpt from,
20 if I might read that whole context.

21 Q (indicating).

22 A Is there a page before this?

23 Q Yes, there is, let me refer you to Page 494:

24 "A In the full schematic there is a diode
25 attached with each switch."

1 495:

2 "All the switches require a diode."

3 A Yes, sir.

4 Q Now, in fact it is the case there is not a diode on each
5 of the playfield switches, is there?

6 A All the switches go through a diode. Some of those
7 diodes are in common, but all switches do go through a diode.

8 Q There is not a diode on each of the playfield switches
9 in the matrix?

10 A That is correct.

11 Q Sneak electrical paths can occur in that playfield
12 switch matrix, correct, with stuck switches?

13 A Yes, sir.

14 Q There is another matter, Mr. Frederiksen, on change No.2
15 on Exhibit 28-A.

16 Change No. 2 on Exhibit 28-A is a change from a
17 14502 to a 14016, correct?

18 A Yes.

19 Q You indicated that change was also made prior to
20 September 1974, is that correct?

21 A Yes.

22 Q I just ask you to inspect the machine and answer me,
23 Mr. Frederiksen, as to what, if you can tell, color wires
24 are predominantly used to wire the 14016, if you can tell its
25 position.

1 (Brief interruption.)

2 BY THE WITNESS:

3 A They appear to be all red wires.

4 BY MR. LYNCH:

5 Q So they appear to have been wired after a time that the
6 yellow wiring was done?

7 A Yes, sir.

8 Q Thank you. As a final matter, Mr. Frederiksen, you
9 testified here, and in the Patent Office you submitted
10 affidavits, that the IQ computer was an iteration prior to
11 the pinball machine, to which you readily moved after you
12 ended your work on the IQ computer, correct?

13 A Yes, sir.

14 Q Did the IQ computer have a switch matrix?

15 A I don't recall explicitly. It had a very simple switch
16 architecture. It would have been as convenient to implement
17 it with or without a matrix.

18 Q Did it have a switch matrix 8 columns wide, as you testi-
19 fied here?

20 A I recall it to be a matrix. I don't recall wiring
21 directly. I just have a poor recollection of that time period.

22 Q Do you have a recollection at all as to whether it was
23 the case or not, Mr. Frederiksen, that in the IQ computer you
24 had 16 switches arranged on the test line?

25 A I don't recall.

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1 Q Do you have any recollection, Mr. Frederiksen, whether you
2 had the switches arranged in the IQ computer in a fashion
3 similar to the way that the Atarian arranged its switches,
4 all in one line, 16 switches in one line?

5 A I don't recall what I did, but I have really no knowledge
6 of what Atari did at all.

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1 MR. LYNCH: I don't have any further questions,
2 your Honor.

3 MR. GOLDENBERG: I have some questions, your Honor.

4 CROSS EXAMINATION

5 BY MR. GOLDENBERG:

6 Q Mr. Frederiksen -- I'm sorry. Go ahead and fold up
7 your drawing, sir.

8 Mr. Frederiksen, you were aware, were you not, that
9 for the past number of years there's been an effort to re-
10 issue your patent in the patent office?

11 A Yes, I've been aware of that.

12 Q And would it be correct, sir, that in the course of
13 those proceedings you were advised that every effort should
14 be made to establish the earliest date of invention for the
15 subject matter of your patent?

16 A They had asked me for, you know, supporting documents
17 and what not for what we had over the years, of course.

18 As far as advising me about the earliest date
19 practical and what not, I have no specific recollections
20 of any advisement of that nature.

21 Q Well, you were asked that you develop information or
22 supply information to your patent attorney, weren't you?

23 A Yes.

24 Q And weren't you asked to gather such information as you
25 could which would, as I said, establish the earliest or first

1 possible date the Flicker game was in operating condition?

2 MR. TONE: Your Honor, I have been sitting here
3 trying to decide whether to claim the attorney-client priv-
4 ilege. I think I have to or I've waived it. So I think I'll
5 object on that ground to communications between the witness
6 and his attorneys.

7 MR. GOLDENBERG: Your Honor, I don't think I've
8 breached that privilege, nor do I have any intention of
9 doing that.

10 I'm trying to find out the background as to why--

11 THE COURT: Well, I think perhaps you can probably
12 get the same information without referring to communications
13 between lawyer and client.

14 You can ask him whether he attempted to get all the
15 information he could to establish the earliest possible date
16 without going into whether any lawyer told him to do that.

17 MR. GOLDENBERG: Surely. I'll do that, Judge.
18 BY MR. GOLDENBERG:

19 Q Well, Mr. Frederiksen, weren't you -- didn't you make an
20 effort to gather information to get the earliest possible
21 date for your invention?

22 A I recall gathering the information in support of the
23 Flicker that we had demonstrated here.

24 I have no particular recollections about trying to
25 beat or to meet any dates, since they specifically avoided

1 giving me any dates for the longest time.

2 Q All right, sir. Well, what kind of information did you
3 attempt to gather?

4 A Just all the materials that we had relating to the
5 Flicker, to the best of my ability. And that's what we
6 gathered.

7 Q And that included these various drawings you've been
8 testifying about today?

9 A Yes.

10 Q And other days.

11 A Yes.

12 Q And that included various program listings?

13 A Not all the listings. Some of them were made recently,
14 as you're aware of. But the ones that were submitted with
15 the Patent Office, yes.

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1 Q In the course of that effort, sir, did you make any
2 effort to verify the accuracy of the drawings?

3 A No, I had not made too serious an effort to try to
4 verify them, since the amount of time to totally reconstruct
5 would have been quite enormous.

6 I gave them all cursory glances and recog-
7 nized the authors of the different drawings and the intended
8 purpose of the different drawings.

9 But as far as re-engineering the drawings, no,
10 I did not do that.

11 Q How about the computer program listing, did you make
12 any effort to verify its accuracy, sir?

13 A I recognized the program, of course. I had written it.
14 And I recognized the different elements of the program.

15 And I made no further attempt to verify it
16 beyond that.

17 Again, the task that I just performed
18 recently in conjunction with the disassembly of the E-PROMS
19 was a very large task. It took me many more than 30 -- 20,
20 30 hours to do that job, and it was something that I did at
21 their instructions finally here. But prior, I just recognized
22 the document.

23 Q Well, now, that task of disassembling the program, that
24 was something you undertook only after the defendants in this
25 case had made an effort to ascertain the actual contents of

1 the memory chips in the Flicker game. Isn't that true?

2 A Yes, sir.

3 Q Now, the computer program listing, Exhibit 436, that
4 was submitted to the Patent Office, we know now that it is
5 inoperative, don't we?

6 A No, sir.

7 Q We don't?

8 A The word inoperative I find somewhat confusing. It's
9 not a technical word.

10 In a technical sense it would mean that the
11 machine just simply was electrically not functional.

12 And if you mean by the fact that if that
13 program were assembled and put in the machine, that it were
14 electrically non-functional, that's true. But if by inopera-
15 tive you meant something different than that, then I don't
16 now what you mean.

17 Q I meant what you just said, sir. Thank you.

18 We also know it's incomplete, don't we?

19 A There were some incorrect areas. I'm not sure what you
20 mean by incomplete.

1 Q Well, sir, if nothing else, the so-called table is
2 missing?

3 A That was a hand-annotated entry after the fact to de-
4 scribe where the routines actually were assembled, and it
5 was only known after the assembly and so, therefore, was
6 never contained in any of the English, and that is true.

7 Q But then you knew, sir, at the time you submitted that
8 to the Patent Office, it did not represent the computer pro-
9 gram actually loaded into the Flicker game?

10 A No, sir. That is not true.

11 Q What is the fact then?

12 A Well, the fact is that any person skilled in the art
13 would understand that the construction of a jump table was
14 very well described in the English portions of that patent or
15 that program.

16 It was very clear, you know, that a table had to
17 be filled in. It was very clear that a table jump was being
18 implied or was being taught.

19 Q I understand your position on that, sir, but could you
20 answer my question?

21 You knew, did you not, that the program listing
22 as submitted to the Patent Office was incomplete if for no
23 other reason than it did not include the jump table?

24 A I do not recall that. I do not recall knowing that it
25 did not contain the jump table.

1 I do not even recall that it did not contain the
2 jump table. I just had no recollection of that.

3 Q Well, you know today that it does not?

4 A Of course.

5 Q You know, also, that the jump table is really more than
6 a jump table, don't you?

7 A I do not understand the question.

8 Q Well, the so-called jump table actually contains patches,
9 does it not?

10 A Yes, sir. That is true.

11 The table portions itself actually do not contain
12 patches, but within the table addressing range, some zones
13 that I was not using were used for patches.

14 Q Now, the computer program, Exhibit 436, was first sub-
15 mitted to the Patent Office with the original patent applica-
16 tion, was it not?

17 A Yes, sir.

18 Q Can you agree with me, sir, that the whole software
19 listing was not submitted to the Patent Office with the
20 original patent application?

21 A This is the only software listing that I ever had that
22 I used as far as constructing those E-PROMs in the Flicker.
23 This is the software listing that I gave the Patent Office.
24
25

1 Q No, sir.

2 My question is: Can you agree with me that the
3 whole software listing was not submitted to the Patent Office?

4 A As far as the English goes, this is all that existed.

5 If by the fact you mean the final assembly and the
6 hex code and the other table patches that were made were not
7 included, that is, of course, true as well.

8 Q So the statement I made is correct?

9 A I gave you my answer.

10 Q You cannot answer yes or no?

11 A If you are talking --

12 It depends upon what you are asking. You are
13 asking about the English. This is all the English that I
14 had to submit.

15 If you are talking about the hex codes, no. I had
16 others to submit.

17 Q How long did you work on the software for the program?

18 A I do not recall exactly, but it was several weeks total.

19 Q From the documentation we have in this courtroom, it
20 appears to have gone from September and into October and
21 perhaps later than that, isn't that true?

22 A There is a date of October on this listing. I must have
23 done something at that date, if nothing more than just simply
24 insert my name.

25 Q Had you forgotten about all of that effort and work when

1 You submitted that program to your patent attorney to prepare
2 the patent application?

3 A I think I -- again, you know, I think I might have
4 forgotten the sequence of events or the chronology.

5 I believe that this listing was later than most of
6 those patches that were made in conjunction with the prepara-
7 tion of the Flicker for the demonstration. But apparently it
8 was -- this is a copy or working copy of before those final
9 patches. I just did not realize that at that time.

10 I did not recall the chronology is what I am trying
11 to say.

12 Q Now, when did you give material to your original patent
13 attorney to prepare the patent application?

14 Was it before the end of the year 1974, or was it in
15 some part of 1975?

16 A It was at the beginning of the year sometime, but I do
17 not recall explicitly if it was like in maybe January or
18 February. Those are my feelings. I do not recall explicitly.

Frederiksen - cross

1 Q So it was within a relatively short time after this
2 work had been done to debug the program to make it work;
3 whereas before it wouldn't, isn't that correct?

4 A If you consider September to January a short time, then
5 that is true.

6 At the types of days reporting in, it doesn't
7 seem too short to me.

8 Q I take it during that same period you also gave drawings
9 to the patent attorney so a patent application could be pre-
10 pared?

11 A Yes, sir.

12 Q Did you make any effort at that time to verify the
13 accuracy of those drawings?

14 A I explained to him the drawing that is on the board
15 right now. I recall doing that.

16 I don't have much recollection about any
17 drawing other than this one since I spent a lot of time with
18 him on this particular drawing.

19 Q As the years went by and we get into 1980, '81, '82,
20 there is being an effort to re-issue the patent. Did you
21 once again inquire or go through your material to see what
22 you had with respect to what you did and when you did it?

23 A This business has been going on a very long time and
24 things get very confusing. If there was some point in time
25 that we have looked at things or what not that you have any

1 questions on, maybe you can be a little more explicit.

2 Q You in fact supplied information or actually made
3 affidavits or declarations, as we call them, for submission
4 to the Patent Office, did you not?

5 A Yes, sir.

6 Q What did you understand was the purpose of those
7 affidavits or declarations?

8 A Clarification of what actually happened.

9 Q What do you mean by clarification?

10 A Just a statement of what the sequence of events were
11 to the best of my recollection.

12 Q They were to tell the story of what you did and when you
13 did it, wasn't that their purpose?

14 A Yes, sir.

15 Q Once again you made a great number of references to
16 drawings and once again you made a reference to this program
17 listing, Exhibit 436, did you not?

18 A Yes, sir, I believe so.

19 Q I would take it, sir, that prior to preparing those
20 declarations, you undertook to make some kind of investiga-
21 tion of what the facts were?

22 A Yes, sir.

23 Q Did you as part of that investigation make any effort
24 to ascertain the correctness of the drawings?

25 A We spent a lot of time preparing, but I really don't

Frederiksen - cross

1 recall explicitly the details of that preparation at this
2 time. That was quite a while ago.

3 Q Did you make any effort, sir, to determine the accuracy
4 of the computer program listing, Exhibit 436?

5 A I validated this program on several occasions as far
6 as its authenticity. As far as validating it as far as
7 engineering-wise or reprogramming the machine, so to speak,
8 no, I did not go that far, nor did I have any materials at
9 that time that were operational, an Intellec machine, to
10 disassemble that code, nor did we have a disassembler. That
11 was something that I just recently wrote on a very new
12 machine.

13 Q You had an Intellec machine at one time, did you not?

14 A I still have that machine.

15 Q Why couldn't you use that to disassemble?

16 A It is not operational. The wires are unplugged. The
17 board is unplugged. It is just not operational.

18 Q I see, sir.

19 You made no effort to use an existing piece
20 of programming equipment and write a disassembler and verify
21 the accuracy of the submitted program listing?

22 A The PROMs in that machine are 1702's. I believe they
23 are P-MOS PROMs, some of the first PROMs that Intel made.

24 None of the PROM blasters subsequent to that
25 date support that part any more, to the best of my knowledge.

Frederiksen - cross

2285

1 None of our PROM programmers do at the office.

2 I didn't have any capabilities of reading that
3 code.

4 Q Once, sir, the defendants in this courtroom decided
5 they wanted to read the code, they didn't have any great
6 difficulty doing it, did they?

7 A I don't know. I have no idea what they have done to get
8 that code.

1 Q And once you decided to disassemble the actual code, you
2 didn't have any great difficulty doing that, did you?

3 A Not at this day, I didn't.

4 But we have many new machines now, very large
5 computers that make that job somewhat simpler. A couple of
6 years ago it could have been an incredibly difficult task
7 for me.

8 Q Well, the fact is that on the 18th of January you were
9 advised that there was a dump of the ROMs, and you were
10 asked to make a comparison. And you completed that on the
11 19th of January, this year.

12 A Yes, sir.

13 Q Now, you recall in one of your declarations to the
14 patent office that you told the patent office that you had
15 worked on this Super I Q computer and it was really part of
16 your effort to complete the pinball invention. Do you re-
17 call that?

18 I can show it to you here, sir, if you ...

19 MR. GOLDENBERG: Judge, this is in Plaintiff's Ex-
20 hibit 1, Volume X, a declaration by Mr. Frederiksen dated
21 June 3, 1981.

22 MR. TONE: May we have the page?

23 MR. GOLDENBERG: 0920-0014 is what I have here. I
24 don't know that I understand that page numbering.

25 MR. TONE: The date?

Frederiksen - cross

2201

1 MR. GOLDENBERG: June 3rd.

2 MR. TONE: Thank you.

3 MR. LYNCH: May it please the Court, your Honor--

4 THE COURT: Do I have that up here?

5 MR. LYNCH: Yes, you do, your Honor. But you've
6 got an awful lot up there.

7 I think that's the one. I think that's the one.
8 BY MR. GOLDENBERG:

9 Q Mr. Frederiksen, I show you this affidavit, and I have
10 particular reference to this page 16, and invite you to read
11 that and, of course, any other part of the declaration you
12 want to read.

13 THE COURT: Well, this will take a few minutes for
14 him to read that, so why don't we take our lunch break.
15 We'll resume again at 2:15.

16 (Court adjourned at 12:25, to resume at 2:15 o'clock
17 p.m. of the same day.)
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1 BALLY MANUFACTURING CORPORATION,
2 a Delaware corporation,

3 Plaintiff/Counterdefendant,

4 vs.

5 D. GOTTLIEB & CO., a corporation,
6 WILLIAMS ELECTRONICS, INC., a
7 corporation, and ROCKWELL INTERNATIONAL
8 CORPORATION,

9 Defendants/Counterplaintiffs.

) Docket No.
) 78 C 2246
)
)
)

) Chicago, Illinois
) March 19, 1984
) 2:40 p.m.
)
)
)
)

9 VOLUME XVI-B
10 TRANSCRIPT OF PROCEEDINGS
11 BEFORE THE HONORABLE JOHN F. GRADY

12 TRANSCRIPT ORDERED BY: MR. JEROLD B. SCHNAYER
13 MR. MELVIN M. GOLDENBERG

14 APPEARANCES:

15 For the Plaintiff/
16 Counterdefendant:

17 MR. SCHNAYER
18 MR. BURNS
19 MR. TONE
20 MS. SIGEL

21 For the Defendants/
22 Counterplaintiffs:

23 MR. LYNCH
24 MR. HARDING
25 MR. GOLDENBERG
MR. RIFKIN
MR. ELLIOTT

26 Court Reporter:

LAURA M. BRENNAN
219 South Dearborn Street, Room 1918
Chicago, Illinois 60604

2

1 (The following proceedings were had in open Court:)

2 THE CLERK: 78 C 2246, Bally v. Gottlieb, case on
3 trial.

4 THE COURT: I see Mr. Meyers in the back. You
5 have no responsibilities here at the moment as far as I know.
6 I mean --

7 MR. MEYERS: No. I am here as an observer.

8 THE COURT: Okay, fine.

9 MR. MEYERS: I hope there is no objection.

10 THE COURT: No, not at all. I just thought if you
11 wanted to know if you are required to do anything, the answer
12 is no.

13 MR. MEYERS: Thank you.

14 JEFFREY E. FREDERIKSEN, PLAINTIFF'S WITNESS, PREVIOUSLY
15 SWORN.

16 CROSS EXAMINATION (Continued)

17 BY MR. GOLDENBERG:

18 Q Mr. Frederiksen, over the noon break, did you have an
19 opportunity to review that affidavit?

20 A Yes, sir.

21 Q I particularly, as I have said, directed your attention
22 to page 16.

23 On page 16 this statement is made:

24 "The basic design of the microprocessor
25 control circuitry for the pinball machine was

Frederiksen - cross

essentially identical to the design of the microprocessor control circuitry which I had developed for the Super IQ computer games because, as stated above, when I designed the microprocessor control circuitry for the Super IQ computer game, I designed it so that it would operate both with the Super IQ computer game and with the pinball machine."

Now, sir, is that statement true?

A Yes, I believe so.

Q Does the Super IQ computer game have a single matrix with switches and some displays in the matrix?

A I do not recall explicitly, as I said earlier.

THE COURT: What is this exhibit number?

MR. GOLDENBERG: This is Plaintiff's Exhibit 1, and it is the reissue application, Judge.

THE COURT: All right, thank you.

MR. GOLDENBERG: My version is in Volume 10. I do not know whether that conforms to your volume number or not.

BY MR. GOLDENBERG:

Q Well, sir, this matter of the matrix configuration of the Super IQ computer game has come up within the past week or so, has it not?

You were asked this question at a deposition, I think, last Monday.

Frederiksen - cross

1 A Possibly. I do not recall right now.

2 Q Well, do you have any recollection of this question
3 coming up within recent days?

4 A I do not recall right now.

5 Q All right.

6 Do you know the voltage available for the
7 lamps in the Flicker game?

8 A Yes. I believe it is in the vicinity of 24 volts DC.

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1 Q Is that what you believe -- what is the basis of that
2 belief, sir?

3 A The Flicker, again I believe, is implemented at a 16
4 mux line level and at that level would require a square root
5 of 16, which is 4, times the lamp voltage, which is 24 volts.
6 They are 6 volt lamps.

7 Q We have done some measurements on it, and we have reason
8 to believe that it is 18 volts. Are we incorrect?

9 A I couldn't tell you. I haven't measured it myself
10 recently.

11 Q Now, sir, when did you receive into your possession the
12 two Flicker games in their electromechanical form that we
13 see here in the courtroom?

14 A As I said before, I think I said in the vicinity of
15 six weeks to two months before the demonstration. I think
16 that is what it was.

17 Q The six weeks would put it about the middle of August--
18 well, put it early August, wouldn't it?

19 A I think it was either late July or early August.

20 Q Sir, I have here a document, which has been identified
21 as Defendants' Trial Exhibit 2-H.

22 Can you agree with me, sir, that is an invoice from
23 Bally showing shipment of the game August 20, 1974?

24 MR. TONE: I am going to object, your Honor, on the
25 ground that this is beyond the scope of redirect and ...

1 re-opened direct. We went into the subject of this invoice
2 early in the case when Mr. Frederiksen was on the stand, I
3 think both on direct and cross examination, and I think it
4 was adequately covered then.

5 THE COURT: What does this pertain to, Mr. Golden-
6 berg?

7 MR. GOLDENBERG: Your Honor, I think the whole
8 question of the status of these games, the work on these
9 games, when the work was done has been brought into question--

10 THE COURT: Well, I think that is true. It has
11 been brought into question by the new material.

12 Now, does this relate to that?

13 MR. GOLDENBERG: Yes, sir.

14 MR. TONE: All right, my statement to the Court, I
15 am informed, was inaccurate. It was Mr. Nutting and not Mr.
16 Frederiksen who testified about this invoice previously.

17 THE COURT: But it does seem to me if it does go
18 to the question of time, it is within the scope of the
19 additional testimony of this witness.

20 MR. TONE: All right.

21 BY MR. GOLDENBERG:

22 Q All right, sir, I am not sure --

23 THE COURT: By the way, does everybody but me know
24 the intervening event that makes the September date so
25 important? Should I remember that?

1 MR. GOLDENBERG: Indeed it is, your Honor.

2 THE COURT: Do you want to tell me at the side bar
3 or is it generally known to everyone?

4 MR. GOLDENBERG: I would rather do it at the side
5 bar, yes.

6 THE COURT: All right, let's go to the side bar.
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(The following proceedings were had at side bar.)

MR. GOLDENBERG: Yes, Judge.

We made reference, of course, to the reissue proceedings in the patent office stretching over a number of years. And in the course of those proceedings we, as protestors, as defendants, put in evidence what we contended was the prior work of Atari.

In very substantial part --

THE COURT: Why don't you lower your voice. That's the purpose of the sidebar.

MR. GOLDENBERG: Yes, Judge.

In very substantial part Bally was able to prevail over that argument by proving a reduction to practice, a completion of the invention, on this September date.

THE COURT: What is the next key date? I mean, apparently November is too late, and ...

MR. GOLDENBERG: Well, we think it is.

THE COURT: What is the event that --

MR. GOLDENBERG: Well, the next key date would be that in November of 1974 Atari had put out in the field for testing some processor-controlled pinball games, and had actually also brought to Chicago, exhibited in a hotel suite in Chicago such games.

THE COURT: I see.

MR. GOLDENBERG: And our position would be that if

1 Bally is not in fact entitled to the September date, the only
2 date they are then entitled to is their filing date in May of
3 1975.

4 MR. LYNCH: I think, your Honor, there's some
5 other -- the evidence will show that Bally itself reduced
6 to practice a game and began its work early in '74, and
7 that game came to fruition in early '75.

8 MR. TONE: In May of '75 it was shown, there was a
9 prototype shown to management.

10 MR. SCHNAYER: However, the evidence will show what
11 it shows about what condition it was in.

12 MR. GOLDENBERG: So, generally speaking, it changes
13 the scope or content of the prior art.

14 THE COURT: Okay, thank you.

15 MR. SCHNAYER: Let me also indicate that the
16 Atari work was found not to be a reduction to practice, both
17 the El Toro and the Delta Queens that were shown in the
18 suite of the invention.

19 MR. GOLDENBERG: I want to add one more thing in
20 connection with that, that to the extent that what Mr.
21 Schnayer says is correct, the attack on the Atari reduction
22 to practice included a recitation of faults and deficiencies
23 which we contend also appear in the Flicker game, and which
24 the patent office was not told about.

25 THE COURT: I don't mean to go into the merits of

1 it. I just wanted to know what the dates were. Fine.

2 (The following proceedings were had in full and open
3 court.)

4 BY MR. GOLDENBERG:

5 Q Mr. Frederiksen, did you have an opportunity to look at
6 those invoices?

7 A Yes, sir.

8 Q Do you have any reason for disagreeing that the game
9 was not -- disagreeing with the statement that the game was
10 shipped from Bally to Nutting Associates on August 20, 1974?

11 A Yes, sir.

12 Q You agree with that statement?

13 A No, sir. I have reason to disagree with that.

14 Q I'm sorry?

15 A I have reason to disagree with that statement.
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Q What is that reason, sir?

A We had the machines earlier than that date, to the best of my recollection.

When they asked us to work on a pinball machine, they were pretty anxious, and they took some machines off the line, to the best of my recollection, and they were brought down by one of their trucks quite directly.

How long it took for the paper work to follow, I don't really know. But the best of my recollection is late July or early August, and so this date would not, in my mind, be the date that it was actually delivered, to the best of my knowledge.

Q Well, sir, attached to the invoice is a document which I represent to you on the basis of my understanding is a shipping log from the files of Bally.

And if I look at the third page of the document, I see the two games going to Nutting Associates on August 20, 1974; and I also see a reference to 16857, which is the number of the invoice.

MR. TONE: Your Honor, I have only one objection to Mr. Goldenberg's question, and that's one word: He says it is a shipping log.

It appears on its face to be a list of invoices. We have a request to admit pertaining to this which we are in the process of trying to track down. But

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1 I am not able to say at this time that it is a shipping log.

2 MR. GOLDENBERG: All right, sir.

3 THE COURT: This is a question of when the Bally
4 machine was delivered to Mr. Frederiksen for him to commence
5 his work on it?

6 MR. GOLDENBERG: That is correct, sir.

7 THE WITNESS: Your Honor, I just don't remember it
8 being delivered that late, and that's the best of my
9 recollection. So I don't know what to tell you about the
10 paper work.

11 BY MR. GOLDENBERG:

12 Q I take it we can agree that the two serial numbers on
13 this invoice, 1060 and 1074, are the serial numbers of
14 the machines in the court?

15 I think I can show you that.

16 THE COURT: Well, we can stipulate to that.

17 MR. TONE: We can stipulate to that.

18 MR. GOLDENBERG: We can stipulate to that.

19 I have no further questions.

20 REDIRECT EXAMINATION

21 BY MR. TONE:

22 Q Mr. Frederiksen, do you recall that Mr. Lynch showed
23 you a letter written by Mr. Nutting in October which is
24 marked Defendants' Exhibit 2-K; and the second paragraph of
25 that letter referred to a production design.

1 Do you recall that? And I show you 2-K so you'll
2 have it in front of you.

3 A Yes, sir.

4 Q Was the electronic Flicker a production design?

5 A The demonstration unit was not. It was a prototype
6 design.

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Frederkisen - redirect

Q When I refer to the electronic Flicker, I am referring to the machine in the courtroom, Plaintiff's Exhibit 333.

That is the one you are saying that you were referring to in your answer?

A Yes, sir.

Q Also, in that letter -- and I should have let you keep it -- there is a reference to second generation design.

Was Plaintiff's Exhibit 333, the electronic Flicker in the courtroom, a second generation design, or did it represent a second generation design?

A I can only surmise as to what he meant by second generation design. That was the first pinball that we built. If there was a second generation design, I can only surmise that it meant the printed circuitboard version of the Flicker that we had built.

Q When you said, "That was the first machine we built," you were referring to what?

A Well, that is the first pinball machine that we built.

Q What is the antecedent of "that"? Are you referring to Plaintiff's Exhibit 333?

A Yes, sir.

Q Mr. Lynch asked you some questions about a source code, what appears to be a source code listing marked Defendants' trial Exhibit 2-T.

That appears to be a version of the Flicker

Frederiksen - redirect

1 program with some omissions and skipped places.

2 Are there missing instructions in the middle
3 of the subroutines?

4 A At least in one spot that I had noted that there was;
5 for example, in the interrupt routine, also, apparently there
6 is another one around instruction 132.

7 Q When you testified on cross examination that there
8 appeared to be a printer problem, did that answer have any
9 relationship to those instances that you have referred to in
10 the middle of the subroutines?

11 A Yes. It appears as though the printer was overrunning.
12 It was getting too many characters, more than it could print
13 with its print buffer, and it would just occasionally dump
14 some of the printing statements.

15 Q You have testified in response to, I think, Mr. Lynch's
16 questions that -- no, Mr. Goldenberg's cross examination --
17 that you completed the comparison of the dumped program, the
18 one dumped from the PROMs, and the program in evidence after
19 having a day -- after having been asked to make the compari-
20 son.

21 Do you recall that?

22 A yes, sir.

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sir 1 Q You also made an analysis of the two programs, a further
2 comparison and analysis, and reached some conclusions with
3 respect to that, did you not?

4 A Yes, sir.

5 Q During your reopened direct examination, we showed you
6 a printout containing those comparisons dated February 28th,
7 1984.

8 Do you recall that?

9 A Yes, sir.

10 Q So how long did it take you to do the analysis and
11 arrive at a conclusion with respect to the comparison of
12 the two programs?

13 A The actual analysis took me almost a month to get all
14 the English on the listings, but the original extraction of
15 the English from the hex decimal code did take the first day.

16 Q Is it correct that the task was not completed, the
17 task of analyzing and reaching a conclusion until approximately
18 February 28th?

19 A Yes, that is correct, for the analyzing, but his
20 question was with reference only to the comparison. The
21 comparison was performed very quickly. The analysis took
22 much longer.

23 By the way, I did have another thought in regards
24 to the analysis, which is on the day of the demonstration,
25 in regards to these patches that you are referring to and

1 whatnot, I recall that there is a bunch -- I did not implement
2 the operator settings.

3 I recall, though, that just before they walked in
4 the door, I plugged in all those wires on the back because
5 they looked kind of sloppy. I wanted them to look pretty
6 when they walked in the door. Then I do recall now -- I
7 had not thought much about this before, but apparently it
8 does relate -- that the machine did not work when I plugged
9 those wires in.

10 The reason it did not work is I had already had
11 those patches in place at the date of the demonstration.

12 Because the patches were in place, when I put an
13 operator's wire on that thing, it caused it to try to execute
14 it instead of to try to just simply -- as a jump table, but
15 there was a patch code there, and it caused the machine to
16 malfunction.

17 I quickly unplugged the wires, and the machine ran
18 normally for the demonstration. I did not have the operator
19 settings in place, but I do explicitly recall that particular
20 instance, and I have not thought much about it until this
21 time.

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Frederiksen - redirect

1 Q You have never told me about it until --

2 A I didn't tell anybody about it. It didn't relate until
3 they started making a big deal about it.

4 Q Mr. Lynch in his cross examination of you referred to
5 Plaintiff's Exhibit 436, which is the program submitted with
6 the patent application that does not contain a jump table.
7 Do you recall that?

8 A Yes.

9 Q Did Mr. Lynch show you any exhibits that did contain a
10 jump table other than the program printed from the PROM dump?

11 A I don't believe so.

12 Q Could a machine have operated, could the Flicker
13 machine have operated on September 26, 1974 if the program
14 did not contain a jump table?

15 A Absolutely not.

16 Q Mr. Frederiksen, how many of you were there at Dave
17 Nutting Associates in the summer and fall of 1974?

18 A Dave Nutting and myself and Paul Smith, just the three
19 of us.

20 Q Paul Smith was the technician, right?

21 A Yes.

22 Q very quickly in a couple of sentences, what were his
23 duties?

24 A They were purely technician duties. In addition to
25 that, he did do some drafting. So he primarily wired the

1 machines for us, wired the cabinets, and he did some of the
2 finished drawings.

3 Q Had you yourself had any experience with patents or
4 patent attorneys in September 1974 or, for that matter, in
5 the winter of '74-'75 prior to the experience in this matter?

6 A Yes, I did.

7 Q When was that?

8 A When I was with Ken-Com in 1972 or '3, I had another
9 invention called the KC-24. It was an encoding system,
10 digital encoding system for pocket pagers.

11 Q Was that your only such experience prior to that time,
12 or were there others?

13 A No, that is the only one.

14 Q How many moves did Dave Nutting Associates make after
15 September 1974?

16 A One major one, and there was a second within our
17 existing complex.

18 The major one was to Chicago or to the
19 Arlington Heights area. We moved to a different building
20 within the same complex.

21 Q Mr. Lynch showed you the December 19 drawings and he
22 compared those or he showed you at the same time as the December 20
23 drawing and he asked you about those, the drawings on those
24 two dates. Do you recall that?

25 A Yes.

Q The December 19 drawings are Plaintiff's Exhibits 49 through 53.

Is it correct that those drawings depict matters other than the CPU board?

A Yes, these are primarily the cabinet wiring drawings.

Q That is true of all of those exhibits?

A One of the exhibits is an actual mux chart, 53.

Q None of them depict the CPU board, is that right?

A That is correct.

Q What does Defendants' Exhibit 2-R, which was drawn on December 20, the next day after those drawings are dated, depict?

A That depicts a proposed production CPU card.

1 Q Will you very briefly explain to the Court the relation-
2 ship between the drawings on December 19 and the drawing on
3 December 20 insofar as they relate to the Flicker and to the
4 Production model of Flicker?

5 A The drawings on December 19 are basically the cabinet,
6 right up to the plugs where you plug a computer, a Bally
7 Brain in.

8 Then there are two types of Bally Brain that you
9 plug into that cabinet at that point. You could plug in
10 either a prototype Bally Brain, which includes the E-PROMs,
11 or you could plug in a production Bally Brain, which would
12 include the actual masked ROMs from the manufacturer, which
13 this drawing 2-R relates to.

14 So basically the other drawings referred to vir-
15 tually everything but the Bally Brain itself.

16 Q The Bally Brain drawing is Defendants' 2-R, is that
17 right?

18 A Yes.

19 Q That, you tell us, is a drawing for a production version
20 of the Bally Brain, is that right?

21 A Yes, it is a proposed production version. I don't re-
22 call ever building it and testing it.

23 Q There is an earlier prototype drawing, Plaintiff's
24 Exhibit 28.

25 Do you remember that without my showing it to you,

2310

1 or do you want to see it?

2 A I should look at it again.

3 Q The testimony is that that was prepared in the summer
4 of 1974 before the electronic Flicker was built, and I be-
5 lieve that the Flicker was built from that, is that correct?

6 A Yes, to the best of my recollection.

7 Q Does that drawing show as containing the programs
8 PROMs or ROMs?

9 A This is a PROM unit. This is a prototype Bally Brain.

10 Q Prototypes would ordinarily contain which, PROMs or
11 ROMs?

12 A PROMs. In order to do the ROMs, you have to send this
13 code to the manufacturer. Then he has to make masks, and
14 these masks are actually etched right into the silicon. It
15 is something that has to be done only in high volume, and
16 so ROMs are done only when you are ready for production.

17 Q Would a production machine contain PROMs or ROMs?

18 A It could contain PROMs, but it is very expensive. In
19 order for a low-cost high-volume production, you really want
20 ROMs.

21 Q Had you ever drawn a production version of the CPU
22 board prior to the one drawn on or about or that bears the
23 date December 20?

24 A Yes.

25 Q When was that?

1 A I think I testified to this before, but it was my prac-
2 tice in those days in this area to start with a production
3 machine to get a feeling for what was involved, and then I
4 would develop the prototype machine from the production in-
5 tentions.

1 Q But I think you testified that the production drawing
2 was Plaintiff's Exhibit 54, is that correct, production
3 drawing of the kind that you just described?

4 A Yes, sir.

5 Q And approximately when was that drawn?

6 A Well, this was drawn in my own hand, and it was drawn
7 earlier in the developmental phase of the architecture for
8 the pinball machine.

9 Q And that would have been in the summer of 1974, or when?

10 A It was earlier. I believe it to be around the summer-
11 time.

12 Q At any rate, it was prior to the building of the
13 electronic Flicker machine, Plaintiff's Exhibit 333?

14 A Yes, sir.

15 Q After the demonstration on September 26, 1974, when you
16 showed the machine to Bally, you testified, I believe on
17 direct examination initially, that certain further work was
18 done on the Flicker relating to the display. Is that cor-
19 rect?

20 A Yes, sir.

21 Q And did that involve the PC board for the displays?

22 A Yes, it did.

23 Q Tell us very briefly what was done after the demonstra-
24 tion in the week -- period of a week or several weeks or a
25 month following the demonstration.

1 A It's very difficult to mark in time exactly what hap-
2 pened after that, since there was not many clear events.

3 But I do recall the things that we did work on:
4 they were the seven-segment displays using the incandescent
5 bulbs so that they would give us a much larger and much
6 brighter digit.

7 There was a lot of complaint about the little
8 half-inch LEDs being a little bit too small. And, although
9 very visible, they thought they might be larger.

10 We also tried, during that period or later on in
11 that period, to use wire switches, where we actually moved
12 some of the rollover switches and put in a couple of pieces
13 of wire.

14 Q I think -- all right.

15 A So that was in that same period, too. Those are the
16 things we worked on after the demonstration.

17 Q Very well. Can you think of anything further?

18 I don't want to go into great detail at this time.
19 We've covered it before.

20 A Yes. Now, those are the two things that I recall.

21 Q All right. During his cross examination Mr. Lynch
22 referred to an Intel manual, Defendants' Exhibit 1-A. Do
23 you recall that?

24 A Yes, sir.

25 Q Did he show you that manual during the cross examination?

1 A I don't recall.

2 Just briefly here? Yes, he did.

3 Q Now, so we may be sure, the Intel manual that we're
4 talking about, Defendants' 1-A, was prepared or at least
5 bears a date of February, 1973. Do you recall that?

6 A No, I didn't recall the date on it.

7 Q (Showing document)

8 A Okay, I see.

9 Q And that is different, is it not, from the Intellec 4
10 reference manual, which is Defendants' Exhibit 1-N? Is
11 that correct?

12 A Yes, it's different.

13 Q The Intel manual, Defendant's Exhibit 1-A, from which
14 Mr. Lynch read, or which he paraphrased, is a reference
15 manual and not a user's manual. Is that correct?

16 A I wouldn't know without -- I'd have to look at the
17 front cover or some information.

18 Q Okay, look at, if you will -- I'll hand you a copy of
19 Defendants' 1-A, and tell me whether that is correct.

20 A Well, this one here is a user's manual.

21 Q All right. Mr. Lynch referred to Appendix F, which in
22 turn refers -- well, let me ask you: Does Appendix F refer
23 to the Intellec 4 system, or does it refer to something else?

24 A Do you know what page Appendix F is on?

25 Q I think if you start -- let me see if I can help.

1 I'll ask you to look first --

2 MR. TONE: May I stand here for a minute, your

3 Honor?

4 THE COURT: Yes.

5 BY MR. TONE:

6 Q -- first at page 129, and ask you what the caption on
7 that page is.

8 A It's SIM4 hardware assembler for the SIM401 and -02.

9 Q And do you know what the SIM401 or SIM402 are?

10 A I've never seen one, but they're a developmental board,
11 not a developmental machine like the MCS4.

12 Q Something different from the MCS4, right?

13 A That is correct.

14 Q Or Intellec.

15 A Yes, it's not an Intellec 4.

16 Q Now, the passage -- by the way, in the copy I gave you
17 the words "Appendix F" are cut off at the top of the page on
18 129, but the original shows that caption.

19 And so apparently Appendix F relates to the SIM4
20 hardware assembly for SIM 4-1 or SIM 4-2. Is that right?

21 A Yes, sir, that's correct.

22 Q And is it correct that the SIM system, if I may call it
23 that, is a prototyping system?

24 A Yes, it's a prototyping system.

25 Q And not a complete developmental system?

1 A I can't speak to how complete it is or not. I've never
2 used one. We used the Intellec 4s only.
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Frederiksen - redirect

Q I have handed you the original of that exhibit now.

Mr. Frederiksen, will you turn to page 135.

What is the heading on that page?

A On the top of the page, it says, "Error Flags."

Q Will you look at that page and tell us whether on the--
is this a so-called two-pass system?

A It is talking about two passes, I believe it to be.

Q What is a pass as that word is used in the manual?

A Well, the computers had very little memory in those
days. It would read the tape through once and memorize such
things as constants and names. They call that pass one.

Then you had to pass the tape through a
second time for it to actually do the assembly. That is why
it is referred to as a two-pass assembler.

Q In the first pass, however, certain errors were de-
tected, were they not, according to this manual?

A Yes.

Q Then on the second pass, certain errors were not de-
tected on the first pass, is that correct?

A Yes.

Q Those were corrected only on the second pass?

A That is correct.

Q If at all?

On what pass were off page references by
JCN or ISZ instructions detected?

1 A On the second pass.

2 Q This, of course, refers to the use of the SIM system
3 rather than the Intellec 4 system, right?

4 A Yes, sir.

5 Q Do you know whether the Intellec 4 system was in
6 existence in February of 1973?

7 A Intellec 4 was a relatively new system. They only had
8 SIMS prior to that that they had to use.

9 We received one of the earlier Intellec 4
10 systems.

11 Q That is, are you saying that when you received the
12 Intellec 4 in the winter of '7-- late of '75, that is to say,
13 in the first few months of '75, you were receiving one of the
14 first Intellec 4 systems?

15 A That was in '74, and it was --

16 Q I am sorry, '74.

17 A It was in and around the March time frame, I believe,
18 and it was a pretty early unit at that time. They were just
19 recently available.

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1 Q Now, Mr. Frederiksen, when an assembly that detects
2 errors in a program, in fact, detects one, does it stop at
3 that point, or does it go on, or can you answer that question
4 in general?

5 A Well, it is very difficult to answer either specifically
6 or in general since it has been a long time since I handled
7 two-pass assemblers, many years.

8 It did record the errors as it would transpire.

9 Q It did record them?

10 A I really cannot recall explicitly about this MCS-4
11 assembler. I really cannot.

12 Q Would an assembler either print out a line showing the
13 error or else go on to the end and then list the errors at
14 the end normally to your knowledge?

15 A I recall that occurring in the F-8 assembler. I do not
16 really recollect what it did with the MCS-4.

17 Q If in operating the Intellec 4 an error in the program
18 is detected, what does the operator of the machine do about
19 it ?

20 A Well, the easiest thing to do is to diagnose why it
21 failed, correct the error, and then try to reassemble it.

22 Q Well, do you do that on the keyboard as you are operating
23 the device, or do you stop and go back and do it on paper?

24 A If it were an assembly area, you would have to go back
25 and do it on paper. If it were actually an assembly area,

I would suspect that you would want to go back and do it on paper.

My recollection is on the particular errors that we are talking about, as they did not get flagged on the MCS-4, and they went through and assembled completely, and I went back and then manually patched those changes when I found out they were jumping to wrong addresses.

I really do not have any recollection of the MCS-4 assembler that I was using flagging these off-page errors.

Q All right, one more question.

The Intellec 4 is a development system, right?

A Yes, it is.

Q Is it involved in the printing of a source code such as Plaintiff's Exhibit 436 from paper tape?

If you want to make a printout from the paper tape, do you use the Intellec 4 for that, or do you use some other device?

A We could print out the paper tape in one of two ways.

If it is preceded by the numbers, the assembly numbers of the addresses where the instructions are at, that was done through the MCS-4 assembler.

If it is just simply a listing of the English, that could be done simply by reading the paper tape with the teletype machine.

Q plaintiff's Exhibit 436 is a listing of the English,

Frederiksen - redirect

1 is it not?

2 That is the program filed with the Patent Office?

3 A. Yes, and that does have the assembly numbers on it as
4 well. So that was dumped through the assembler on the MCS-4.

5 Q It was done through the assembler on the MCS-4?

6 A. Yes.

7 Q That is shown by the presence of the assembly numbers?

8 A. That is correct.

9 MR. TONE: Very good. May I have a moment, your
10 Honor?

11 THE COURT: Yes.

12 (Brief interruption.)

13 MR. TONE: One more question, your Honor.

14 BY MR. TONE:

15 Q Referring to Exhibit 2-K, the letter from Mr. Nutting
16 to Mr. Conroy of October 18th, 1974, the third paragraph
17 refers to some one and a quarter-inch high numerals.

18 Are those 7-segment displays?

19 A. Yes, sir.

20 MR. TONE: No further questions, your Honor.
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1 THE COURT: Any further --

2 MR. LYNCH: No questions, your Honor.

3 THE COURT: All right.

4 MR. GOLDENBERG: No questions.

5 THE COURT: Thank you, Mr. Frederiksen. You may
6 stand down.

7 (Witness excused.)

8 MR. TONE: Will counsel approach the Court with me?
9 I don't think we need the reporter for this.

10 (There was a sidebar off the record, after which there
11 was a brief recess.)

12 (Witness sworn.)

13 ALPHONSE GREGG, Plaintiff's witness, sworn.

14 DIRECT EXAMINATION

15 BY MR. TONE:

16 Q Will you state your name, sir?

17 A Alphonse Gregg.

18 Q Where do you live, Mr. Gregg?

19 A 6047 North Marmora, Chicago.

20 THE COURT: Is that G-r-e-y or a-y?

21 THE WITNESS: G-r-e-g-g.

22 THE COURT: Oh, Gregg. Thank you.

23 THE WITNESS: Shorthand.

24 BY MR. TONE:

25 Q Are you presently employed, Mr. Gregg, or are you

1 retired?

2 A I am retired.

3 Q Calling your attention to the years 1965 until October,
4 1969, by whom were you employed during that period?

5 A Williams Electronics.

6 Q What was your position with that company?

7 A I was chief electrical engineer and vice-president of
8 engineering.

9 Q In October 1969, did your employment change?

10 A Yes.

11 Q What happened then with respect to that?

12 A I went to Bally Manufacturing, and I was the chief
13 engineer of the novelty division there.

14 Q Until when?

15 A Until May of 1974.

16 Q In that position did your responsibilities include
17 pinball games?

18 A Yes.

19 Q Did they include all of Bally's coin operated pinball
20 games?

21 A Yes.

22 Q Have you observed any developmental work on electronic
23 pinball games while you were at Bally?

24 THE COURT: While he was at Williams or --

25 MR. TONE: No, I mean at Bally, your Honor.

1 THE COURT: Bally.

2 MR. TONE: We are in the period now after --

3 THE COURT: After Williams.

4 MR. TONE: -- after Williams, right, in the period
5 October of '69 to May, 1974.

6 BY THE WITNESS:

7 A Yes, there was one machine put together by Texas In-
8 struments. It was a partially solid-state machine.

9 BY MR. TONE:

10 Q Was that TTL technology?

11 A Yes.

12 Q Did you have anything to do with that machine?

13 A I just costed the machine out.

14 Q That is to say, you determined how much it would cost
15 Bally to build it --

16 A To produce.

17 Q -- in production volume?

18 A Right.

19 Q Did you reach any conclusions with respect to the work
20 you did?

21 A Yes, at the time it was too expensive to produce.

22 Q That machine was called what?

23 A Big Valley.

24 Q Was it microprocessor controlled?

25 A No.

- 1 Q In June 1974 did your employment change again?
- 2 A Yes.
- 3 Q Where did you go then?
- 4 A Went to Williams Electronics.
- 5 Q Did you remain at Williams for a period of time?
- 6 A Yes, until December '77.
- 7 Q What was your position at Williams at that time?
- 8 A I was chief electrical engineer.
- 9 Q And that had been the position you had held in your
- 10 previous employment with Williams, is that correct?
- 11 A Yes, it was.
- 12 Q What did your responsibilities at Williams as chief
- 13 electrical engineer during the period '74 to '77 cover?
- 14 A That entailed all the electrical functions of a
- 15 machine that had been handled in whatever way. Anything
- 16 electrical, why, it was my responsibility.
- 17 Q Did it particularly include pinball machines?
- 18 A Yes, yes.
- 19 Q To whom did you report?
- 20 A To Frank Murphy.
- 21 Q What was his title?
- 22 A Vice-president of engineering.
- 23 Q You left Williams in January of 1978?
- 24 A Yes.
- 25 Q Were you employed by anyone between that time and March

1 of 1979?

2 A No.

3 Q In March of 1979 did you take employment with another
4 company?

5 A Yes, I did.

6 Q What company?

7 A That was Game Plan.

8 Q How long did you remain with Game Plan?

9 A One year.

10 Q That would have been in March of 1980 when you left them?

11 A Right.

12 Q Since then what have you done?

13 A I have retired.

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Gregg - direct

1 Q While you were employed at Williams as chief electrical
2 engineer, did the company start work on a solid state elec-
3 tronic pinball machine?

4 A Yes.

5 Q When?

6 A It was late '75.

7 Q Why was the decision made to start such a project?

8 MR. GOLDENBERG: Objection. Foundation.

9 THE COURT: Well, yes, I think he ought to tell
10 of a conversation or whatever.

11 MR. TONE: Fine.

12 BY MR. TONE:

13 Q By whom were you instructed to begin the project?

14 A That was by Mr. Sam Stern. He was the president of
15 Williams Electronics.

16 Q And did you have a conversation with him about it, or
17 a series of conversations?

18 A Oh, it was a series of conversations with him and with
19 Murphy and with Jack Mittel and various other people.

20 Q And were those various other people employed as
21 officers or in a supervisory role with Williams?

22 A Yes.

23 Q Do you remember any specific conversation, Mr. Gregg,
24 or do you remember these conversations as a whole?

25 I'm relating now to conversations about the

Gregg - direct

1 commencement of this project.

2 A Oh, one specific one I recall was with Jack Mittel, he
3 was the vice president of sales.

4 And he was getting a lot of flack from the
5 market that we had to come out with a solid state machine in
6 order for them to be able to sell it.

7 So we were trying to determine when we
8 really needed this unit to go into production.

9 Q Can you tell us when that conversation occurred?

10 A Would be right in the area there, late '75.

11 Q Late '75. I thought you -- the project started when,
12 did you say?

13 A That was right about the time the project got rolling.

14 Q The conversation occurred at about the time the pro-
15 ject got rolling?

16 A Right, right.

17 Q And did you have conversations with Sam Stern and
18 others at Williams about the reason for beginning a solid
19 state pinball development?

20 A Yes.

21 Q And can you tell us, did those differ, or were they
22 similar to the one you had with Mr. Mittel, if I can ask that
23 question to shorten this?

24 A They were all basically the same. Everybody had the
25 same conclusion, that it's going to come and that's all there

Gregg - direct

1 was to it.

2 Q Who was in charge of the project?

3 A I was in charge of it.

4 Q And to whom did you report in connection with this
5 project?

6 A To Sam Stern.

7 Q How did you go about staffing and working up the pro-
8 ject?

9 A I had tried to get some knowledgeable help by adver-
10 tising in the paper and talking to salesmen, if I could get
11 somebody that was software oriented and was processor knowledge-
12 able.

13 But there wasn't any -- unable to get anybody.

14 Q Was there a Mr. Ray Macie who worked for Williams at the
15 time?

16 A Yes.

17 Q Did he do anything in connection with an attempt to
18 develop a solid state pinball game?

19 A Yes. He worked on the coin recognition circuit in
20 TTL.

21 Q And what were the results of his work?

22 A The result was that we had to get into production with
23 a coin system as he was working on, and the thing wasn't cost
24 effective to begin with.

25 And then the urgency of to get it in the

Gregg - direct

1 machine going down the line, why, we had to go into the
2 electromechanical devices.

3 Q So you put the device in an electromechanical pinball
4 game. Is that it?

5 A Yes.

Gregg - direct

1 Q Did there come a time when you decided to seek or to
2 seek out outside help in the project?

3 A Yes.

4 Q What persons or companies did you contact in that con-
5 nection?

6 A Well, there was Digital Games; then there was Rockwell
7 International; and National Semiconductors; and Seeburg.
8 and Intel.

9 Q Let's take them one at a time.

10 Who had the contacts with Digital Games? Did you?

11 A Mr. Stern had the contact with Digital.

12 Q Did you have any connection with the relationship be-
13 tween Williams Electronics and Digital Games?

14 A I had made up some transformers and coils according
15 to their specs for them, and that was the extent of my con-
16 tact.

17 Q Did Digital Games do some work in an attempt to develop
18 an electronically-controlled pinball game?

19 A Yes.

20 Q Did Williams pay them some money for that work?

21 A Yes.

22 Q Did you know how much?

23 A It was \$25,000.

24 (Brief interruption)

25 MR. TONE: I won't delay any longer, your Honor. We'll

1 work this out among counsel.

2 MR. GOLDENBERG: Your Honor, it certainly appears
3 to me to be a document from the files of Williams. And
4 subject to error being shown, we have no problem.

5 THE COURT: Okay.

6 MR. TONE: That's satisfactory. Thank you, Mr.
7 Goldenberg.

8 BY MR. TONE:

9 Q I show you Plaintiff's --

10 MR. TONE: Well, I won't even take the time to
11 show it to the witness.

12 I will offer in evidence as Plaintiff's Exhibit
13 437 a two-page document containing a memorandum dated May
14 5, 1976, I think, and an invoice, and I will try to get a
15 better copy to substitute for this one.

16 It shows an invoice from Digital Games, Inc. to
17 Williams for \$25,000.

18 BY MR. TONE:

19 Q Now, turning to Intel, who worked with Intel?

20 A I did.

21 Q Tell us about Intel's work and the results thereof.

22 A Their proposal didn't get very far; that they wanted
23 front money before they would start any real work on it.

24 And the local rep made a proposition that he could
25 put together a machine using two various boards that he had

1 on hand that he was going to use for somebody else, and that
2 was the extent of it.

3 As soon as he wanted money and a hard contract, why,
4 we weren't ready to give him any. And that was dropped.

5 Q Turning now to Rockwell, who handled the dealings
6 with Rockwell?

7 A Stern and myself.

8 Q Tell us in summary what those dealings were and what
9 work Rockwell did.

10 A Rockwell came in and saw our product, and they were
11 interested in producing or building up a control unit for a
12 solid state machine.

13 And we agreed that if the units were satisfactory,
14 and then they would have the contract.

15 Q Did you eventually supply Rockwell with an electro-
16 mechanical game to use in the project?

17 A Yes, we did.

18 Q What game was that?

19 A Oh -- come on --

20 Q Does Aztec refresh your recollection?

21 A Aztec, right.

22 Q And do you know when that was?

23 A That was in December of -- is that '75 or was it '76?
24 What's your recollection?

25 A It must have been '76, I think -- or is it?

1 Q I made you guess, Mr. Gregg. I'm trying not to lead
2 you, but your first meeting with the Rockwell people, I
3 believe, was in September of 1975.

4 Would that refresh your recollection as to when you
5 shipped the game to them?

6 A You are right. I'm sorry. These dates and ever-
7 thing, they just throw me for a loop, because the game--

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1 Q So the game --

2 Mr. Goldenberg?

3 MR. GOLDENBERG: Your Honor, I am a little bit concerned
4 about the amount of leading.

5 THE COURT: Well, I take it Mr. Tone is reading from
6 some document, or am I wrong?

7 MR. TONE: All I have is an outline, your Honor.

8 THE COURT: I thought maybe you had some memorandum
9 of a meeting.

10 MR. TONE: No. I have an outline. I am not reading
11 from a document.

12 I was leading the witness because he seemed to have
13 trouble recalling.

14 THE COURT: Well, let's find out how he can place it in
15 '75.

16 MR. TONE: All right.

17 BY MR. TONE:

18 Q How do you place the event in 1975?

19 A Well, it was just before Christmastime, and the people
20 that came in to talk to us were talking about their
21 Christmas holiday. They have in California -- most of them
22 have the week between Christmas and New Year's off; and that
23 is what they were all talking about, how they were going --
24 able to get anything started and sustain any momentum.

25 THE COURT: Christmas comes every year, though.

1 How do you know it is '75 rather than '76?

2 THE WITNESS: Oh, it was soon after we had started
3 talking to the people. Stern came back, and it was one of
4 the first things that was, you know, done. So it had to be
5 the winter of '75.

6 BY MR. TONE:

7 Q Turning now to National Semi-Conductor --

8 THE COURT: Are you coming back to Rockwell?

9 MR. TONE: We will come back to Rockwell, yes, your
10 Honor.

11 THE COURT: All right.

12 MR. TONE: I am just really going through this.

13 THE WITNESS: Stern left in '76. He left in March of
14 '76. So that is --

15 BY MR. TONE:

16 Q With reference to National Semi-Conductor, what was
17 done toward getting their assistance in developing a game?

18 A They came in and looked over what we were asking for,
19 and the thing just floated for quite some time.

20 Q When did you begin talking to them in relation to the
21 time you began talking to Rockwell?

22 A It was about the same time frame, very close.

23 Q With what persons at National Semi-Conductor did you
24 talk?

25 A Michael Stroll was the one I can remember best because

1 he was their chief engineer at the time.

2 Q Was Mr. Macie involved with you in those conversations
3 with the National Semi-Conductor people?

4 A He may have been on one or two.

5 Q Did there come a time when National made a proposal?

6 A Yes.

7 Q I am handing you Plaintiff's Exhibit 439.

8 Is that the proposal from National Semi-Conductor?

9 A Yes, it is.

10 Q Did you as chief electrical engineer of Williams
11 receive the original of which that exhibit is a copy?

12 A No, I did not.

13 Q Did you see it about that time?

14 A Yes, because I was issued a Xerox copy.

15 Q About when was that?

16 You may look at the exhibit if that helps
17 refresh your recollection.

18 (Brief interruption.)

19 A This would be early '76.

20 BY MR. TONE:

21 Q Did Williams supply National Semi-Conductor with an
22 electromechanical game at any time?

23 A Yes, we did.

24 Q What game and approximately when?

25 A That was the Grand Prix, and it was either April -- more

1 likely May of '76.

2 Q You shipped them that game?

3 A Yes.

4 Q Did they then begin work on the project?

5 A They started work on the controller.

6 Q Now, the fifth company mentioned was Seeburg.

7 Was that a parent to your understanding of
8 Williams Electronics?

9 A Yes.

10 Q Did someone at Seeburg to your knowledge want Seeburg-
11 Chicago to work on the project?

12 A Yes.

13 Q Who was that?

14 A Louis Nicastro.

15 Q Who was he?

16 A He was the chairman of the board.

17 Q Did Seeburg do any work on the project?

18 A Yes, they did.

19 Q What did they do?

20 A They put the work on a controller, and we got together
21 a Grand Prix prototype, and the thing just never functioned
22 right, and we just could never get the thing running without
23 bugs in it.

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Gregg - direct

1 Q I think you said that Mr. Stern left Williams in early
2 1976. Was that while this project was still going on?

3 A Yes.

4 Q Did there come a time when you went out to an arcade to
5 look over some machines which you understood were computer
6 controlled?

7 A Yes, that was Ray Macie and myself that went out to
8 Bolingbrook to look at a Bally machine.

9 Q That was Bolingbrook, Illinois?

10 A Yes.

11 Q I show you Plaintiff's Exhibit 162, and I ask whether
12 that exhibit relates to your visit to look at the Bally
13 machine?

14 A Yes, it is.

15 Q This exhibit is dated February 25, 1976, and it is
16 addressed to you, purports to be from Jack M. Mittel.

17 Did you receive that at or about that time?

18 A Yes.

19 Q Did you then after receiving this go out to Bolingbrook
20 with Mr. Macie to see the Bally Bow and Arrow machine?

21 A Yes, we did.

22 Q What did you observe in that visit?

23 A There were two people playing the machine while we
24 were there and the machine functioned properly.

25 After the people got through, we tried to

Gregg - direct

1 play it, and we tried cheating it -- or you wouldn't call it
2 cheating, flipping the switch on and off and stuff.

3 Then we came back to work.

4 Q About when was that, Mr. Gregg?

5 A That was within a few days after, if not the following
6 day maybe, after this notice I received.

7 Q Turning back now to the Rockwell project, during 1976
8 did you yourself observe the progress Rockwell was making?

9 A Yes, I did.

10 Q Can you tell us what you did and what you observed in
11 a summary way?

12 A I made a number of trips out to Rockwell.

13 Q What did you see when you went to Rockwell?

14 A At Rockwell they were working on the Aztec solid state
15 controller, and the first time I went out there was with a
16 group of other people and went there to evaluate their
17 facilities.

18 At that time when I saw the machine, I didn't
19 think they were progressing fast enough because --

20 Q In what condition was the machine and anything sur-
21 rounding it?

22 A It was not a stand-alone machine. It was still on an
23 assembler, and the readouts, they flickered very badly. The
24 switches weren't scoring properly. They would double score,
25 and then the spinner on it would just give you any random

Gregg - direct

1 score, which is not correct. It should give you a score one
2 for each flip. The switch times were all off on it.

3 Q What was your opinion with respect to the progress they
4 had made at that point?

5 A I thought they could have done a little better with
6 the time they had.

7 Q After that visit did you report back to your superiors
8 at Williams?

9 A Yes.

10 Q Did you report your conclusions to them?

11 A Yes.

12 Q Now tell us what you did about observing the work of
13 National Semiconductor during 1976.

14 A Frank Murphy and I went out in August of '76 to check
15 the progress with National Semiconductor. They had a Grand
16 Prix machine that they were working on. They had this model;
17 it was a stand-alone model.

18 They had a few bugs left in it, and I pro-
19 ceeded to point them out.

Gregg - direct

1 Q Let me interrupt, Mr. Gregg, with your Honor's permission.

2 Mr. Gregg, if at any time you wish to take a brief
3 recess, all you need to do is hold up your hand and then
4 just step down. You don't need to wait.

5 THE COURT: Do you want to take a recess now?

6 THE WITNESS: No.

7 BY MR. TONE:

8 Q What were the problems?

9 A One problem that stands out was the scoring was done on
10 the wrong player under given conditions that when the ball
11 left the playfield, it was scored for the subsequent player
12 rather than the one that should have got the bonus score.

13 Then another one was the spinner wasn't scoring
14 properly. It just rang up a score of 5 or 10, and the tones
15 were nowhere near coordinated with the spinner's flop.

16 Then another one was the coin switches weren't
17 working properly.

18 Q Any others?

19 A The other thing that was demonstrated, at the time
20 we had discussed zero blanking on the machine, and they had
21 this hooked up and it was by flip of a switch in the back
22 box, we were able to blank the zeros on it or put them back
23 into the face of the machine.

24 Q Did you reach a conclusion about the progress National
25 Semiconductor had made?

, 2

1 A. They were doing very well at the time.

2 Q Did you so report to your management?

3 A Yes, Frank Murphy was there with me.

4 Q He was with you?

5 A He was with me, yes.

6 Q Turning to the Seeburg Chicago, by September 1976 what
7 was the progress of their work, state of progress?

8 A They were still having considerable trouble with the
9 machine, and they still didn't have the thing on stand-alone
10 operation. It was still hooked to an assembler.

11 Q I show you, Mr. Gregg, Plaintiff's Exhibit 236, which
12 purports to be a status report on solid-state pin game
13 development, dated December 3, 1976, to Messrs. Nicastro and
14 Hughes from Mr. Murphy, with a copy to you, and I ask you
15 whether you recognize it?

16 A Yes, I co-authored with Frank the information on it.

17 Q You were the co-author of this document?

18 A Yes.

19 Q Was the document sent, to your knowledge, to the address-
20 ees?

21 A Yes.

22 Q The document is dated September 3rd, 1976. Was there
23 any development specifically relating to Rockwell shortly
24 after that date?

25 A We were having some problems yet, I think, with a

1 couple of the memory chips, or one of them specifically that
2 I recall that was going haywire on us.

3 Q Are the memory chips to which you refer PROMs?

4 A Yes, it was a PROM.

5 Q Did that --

6 A It was a mask PROM. I think it was their type 8017
7 or something like that.

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Q I show you Plaintiff's Exhibit 442, dated November 22, 1976, which purports to be a summary of a meeting held at Williams a few days earlier, and I ask whether you recognize that memorandum.

THE COURT: What is that number, Mr. Tone?

MR. TONE: Your Honor, that is Plaintiff's Exhibit 442.

BY THE WITNESS:

A Yes, this is the document from the meeting with the Seeburg people.

BY MR. TONE:

Q Did you attend the meeting?

A Yes, I did.

Q Does this memorandum accurately state the matters presented by Williams and the conclusions reached?

A Yes. Yes.

Q I didn't ask you one question with respect to the memorandum of September 3, 1976:

Does that accurately describe the status of the Rockwell, National and Seeburg projects as of that date?

A Yes, sir.

THE COURT: What was that number?

MR. TONE: That number, your Honor, was 236. We had that a minute ago, and the witness identified it.

THE COURT: I guess I didn't read it. 236.

Gregg - direct

2346

1 MR. TONE: 236. And that's a memorandum that
2 describes the status of -- purports to describe the status
3 of the work being done by Rockwell, National Semi Conductor,
4 and Seeburg.

5 I'll pause for a minute to allow your Honor to
6 read that.

7 THE COURT: Thank you.

8 (Brief interruption)

9 THE COURT: All right, thank you, Mr. Tone.

10 MR. TONE: Very well, your Honor. We'll proceed.

11 BY MR. TONE:

12 Q Calling your attention to the subject of electrical
13 noise, was that a matter that came to your attention during
14 this development project?

15 A Yes, it did. In fact, that was one of the biggest
16 problems with digitals, is noise and the elimination of
17 noise from the system.

18 And that had me going in circles quite a while.

19 Q Were there any particular problems, any specific in-
20 stances that you can recall that related to noise?

21 A Well, there were a number of cases where the -- you
22 would be playing the machine and then something would happen
23 to it and the program was gone.

24 I mean, the machine just died right on its feet
25 right in front of you.

1 You search high and low, you can't find anything.
2 Flip the switch on and off, and the machine works perfectly.

3 You know, what caused it: check through the
4 program and the parts, and can't find anything wrong with it.

5 So along the line someplace, why, we decide it's
6 noise entering the system, so then we have to de-bug it or
7 stop the noise from getting into the controllers.

8 Q Is one of the kinds of noise electrostatic noise?

9 A Yes, that is probably the biggest one.

10 Q Can you tell us specifically what that involved in your
11 experience?

12 A Well, the electrostatic noise, depending on conditions
13 and the location and the individuals involved, why, walking
14 up to a machine after walking over a rug in the dry season,
15 especially in the winter months, why, you build up quite a
16 charge in the human body.

17 Now, to discharge it, all you'd have to do is
18 touch the machine or come in close proximity of the machine,
19 and you could blast the machine, if you were fully charged.

20 Now, the male of the species can put out maybe
21 about 15 to 17,000 volts on a good charge, and the female
22 will run you about 19,000 volts. And why, I don't know.

23 THE COURT: That probably accounts for certain
24 historical facts, I'm not sure which ones.

25 (General laughter)

MR. TONE: I'm not either, your Honor, but it is
interesting.

Gregg- direct

1 BY MR. TONE:

2 Q
3 Mr. Gregg, did there come a time when the outside
4 projects that were commissioned by Williams Electronics were
5 terminated?

6 A
7 Yes, they were.

8 Q
9 How did that come about?

10 A
11 Mr. Stroll came in and took over as president of
12 Williams Electronics.

13 Q
14 Is that the Mr. Stroll whom you have testified a few
15 minutes ago was with National Semi-Conductor?

16 A
17 Yes, he is.

18 Q
19 When did Mr. Stroll come to Williams?

20 A
21 That was in September -- oh, wait a minute. To
22 Williams? He came to corporate in '77.

23 Q
24 Do you remember when in the year?

25 A
26 Wait a minute. Excuse me.

27 (Brief interruption.)

28 BY THE WITNESS:

29 A (Continuing) I am trying to relate now when this show
30 was. That was '76.

31 Excuse me. That was '76 that he must have
32 come in, late '76.

33 BY MR. TONE:

34 Q
35 If you will look at 442, that exhibit dated November
22nd, 1976, does that refresh your recollection, if you look

1 at the persons in attendance?

2 A

Yes, it does. He came to corporate Seeburg in '76.

3 It was in early September or late August of '76.

4 He went to work for Mr. Nicastro as his
5 technical advisor.

6 Q Then did he move from there to Williams at a later time?

7 A Yes, at a later date.

8 Then he moved into Williams as president of
9 Williams Electronics.

10 Q When was that?

11 A That was late '77 or the middle of '77, in that range.

12 Q With reference to that event, when were the Rockwell,
13 National Semi-Conductor, and Seeburg projects terminated?

14 A They were terminated at that time.

15 Q After Mr. Stroll came in as president of Williams?

16 A Exactly before he came in already, or if he was just
17 coming over from corporate, but he terminated the projects.

18 Q It was he who made the decision?

19 A He made the decision, right.

20 Q During the time the developmental work you have
21 described was going on, did you or anyone else at Williams to
22 your knowledge have occasion to examine a Bally microprocessor
23 controlled pinball machine other than the Bow and Arrow you
24 have already described?

25 A Yes, we did.

Gregg - direct

2350

1 Q

Tell us about it.

2 A

It was a machine that was brought in. I can picture
3 it, and I cannot picture the name on it.

4 Q

Was it a Night Rider?

5 A

Night Rider was the name.

6 Q

That was a Bally machine?

7 A

That was a Bally machine.

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Q Was it a microprocessor controlled machine?

A It was microprocessor controlled, and I actually measured the strobe times on it to compare it to the Rockwell system, and the Bally machine was running a lot faster than the Rockwell was.

Q Who else examined that machine?

A Oh, everybody in the engineering department went through it.

Q At Williams?

A At Williams, yes.

Q What else was done besides the measurements you spoke of, if anything?

A Well, the measurements that I had done was the only measurements that I know of, but the machine was played with extensively to check their features out and all, what the different switches, and how they handled things was done.

Q Did Williams have in its possession any schematics relating to that machine?

A Yes. It came with a full complement of schematics.

Q Did Mr. Stroll to your knowledge examine or play the Night Rider machine?

A Yes, he did.

Q Which did he do?

A He did both. He played, and he examined the machine.

Q Turning to the Mirco Spirit of '76, do you remember

1 that machine?

2 A Yes.

3 Q Did Williams have access to one of those?

4 A Yes, we did.

5 Q Tell us about that.

6 A That machine never functioned completely in our pres-
7 ence.

8 It was determined that they strobed into all of
9 their switches, and that was the extent of it because we
10 could never get the thing to play consistently for any
11 length of time.

12 Q That was a microprocessor controlled machine, was it
13 not?

14 A The Mirco?

15 Q Yes.

16 A I think it was.

17 Q How early did you have that Mirco machine?

18 A Oh, that came in real early. It was there before even
19 Rockwell had showed up or National. It must have been in
20 '75, late '75.

21 Don't mind me. I am thinking out loud.
22 MR.TONE: All right.

23 May I have a moment, your Honor?

24 THE COURT: Yes.

25 (Brief interruption)

1 BY MR. TONE:

2 Q I think I omitted to ask you what happened to the
3 digital game project when you tried to enlist digital games
4 assistance?

5 A The digital game project was terminated before it
6 even got started.

7 Q So it never resulted in a prototype machine?

8 A No machine, no prototypes were built, nothing, nothing
9 that I saw from it.

10 THE COURT: This is the whole program at Williams
11 that you are talking about?

12 THE WITNESS: No. This was from Digital Games..

13 THE COURT: Digital games.

14 MR. TONE: Your Honor will remember that the
15 Digital Games was one of the five outside companies.

16 THE COURT: Yes.

17 MR. TONE: If the Court please, we offer Plain-
18 tiff's Exhibits 437, 439, 162, 236, and 442.

19 THE COURT: All right, those are all received.

20 MR. LYNCH: No objection, your Honor.

21 (Plaintiff's Exhibits 437, 439, 162, 236, and 442 were
22 received into evidence.)

23 MR. TONE: No further direct examination.

24 THE COURT: All right, we will take a ten-minute
25 recess.

CROSS EXAMINATION

1
2 BY MR. GOLDENBERG:

3 Q Mr. Gregg, in the period '74 through '77 when you
4 returned to Williams after working for Bally --

5 A Yes.

6 Q -- did you yourself have any background or experience
7 in solid state circuits?

8 A Professionally or --as a hobbyist I play with them.

9 Q How about professionally, sir?

10 A No.

11 Q What did you do as a hobbyist?

12 A Well, I am a licensed amateur radio operator, and I
13 build transmitters. And my speciality is radio controlled
14 model airplanes. And I like to build the control circuits
15 and the receiving equipment and the transmitting equipment
16 for it.

17 Q Do you design those circuits yourself, sir?

18 A Yes.

19 Q Were you doing that in the period '74 through '77?

20 A Yes.

21 Q Now, were those digital circuits?

22 A Yes.

23 Q Had you had any experience with computers during that
24 period?

25 A No.

Q Now, the persons -- I assume when you were at Williams as chief electrical engineer you had persons reporting to you?

A Yes.

Q Who were they?

A Oh -- do you want the whole list, or just some particular --

Q The names that you remember, sir.

A Oh, there was Macie, Chris Otis, Pete Sagin, Al Otroski, Don Kernew, Dick Valosic, Herby Ewer, and a few technicians I don't even remember their names.

Q Now, were any of those people digital product designers?

A No.

Q Did they design electrical circuits at all?

A Yes.

Q These were the electromechanical circuits that went into Williams' games at that time?

A Yes.

Q Did that include Mr. Macie?

A Yes, he did.

He didn't work on the pin game except for the one case there where we took the electronic unit and we were going to put it into the pin game.

Q What kind of an electronic unit was that?

1 A It was TTL based unit, recognized the coins from the
2 entry slot.

3 THE COURT: TTL is what?

4 MR. GOLDENBERG: Transistor to transistor logic. It
5 was a particular form of random logic.

6 BY MR. GOLDENBERG:

7 Q Am I correct in that, sir?

8 A Basically, yes.

9 Q Do you want to elaborate?

10 A No, that's -- I was asked that question once before,
11 and the nearest thing I could come to really sum it up real
12 fast would be: That a number of transistors connected in
13 series to form a circuit; the transistors can be turned
14 on and off to perform mathematical logic, is the nearest I
15 could boil it down to anything. Otherwise it's a real --

16 THE COURT: That's good enough for me. Any more than
17 that, I wouldn't be able to follow it.

18 THE WITNESS: Good.

19 BY MR. GOLDENBERG:

20 Q What was this coin identifier to do?

21 A It would recognize, depending on what chutes were put
22 on the machine, it would recognize the coin that was
23 dropped, and it would give it a certain fixed value, whether
24 the value was a nickel, quarter or dime, and the bonus
25 connected with it, if there was any, because on a single-play

Gregg - cross

2357

1 machine, why, you had a single coin drop, why there was in
2 this case, say, a nickel, then you got one credit; if you put
3 in a dime and the operator wanted to set it for such, he
4 could set it up so that the dime would give you three credits,
5 and you get three plays out of it.

6 And the quarter could be anyplace on up to about
7 10 credits, if he wanted to.

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Gregg - cross

1 Q So for its operation, it depended on a coin being
2 dropped in --

3 A In a slot.

4 Q -- in a particular coin slot on the coin door?

5 A Right, and then it was recognized in the unit as to its
6 value.

7 Q Was that ever incorporated into a Williams product?

8 A Yes, it was. It was incorporated as an electromechani-
9 cal device, though.

10 Q The solid state version was not?

11 A It was not.

12 Q Did Mr. Macie, to your knowledge, have any experience
13 in computers or microcomputers in 1974 through 1977?

14 A No, he did not.

15 Q In 1975 when Williams went outside to various companies
16 to get help on solid state games, would it be because they
17 did not have that capability in-house?

18 A Yes, it was.

19 Q You mentioned Mr. Mittel. Who is he, sir, Jack Mittel?

20 A Jack Mittel was the vice president of sales.

21 Q Mr. Stern, who was he?

22 A Mr. Stern was the president.

23 Sam Stern, excuse me.

24 Q That is Sam Stern?

25 A Right.

Gregg - cross

1 Q

He was the president of Williams?

2 A

He was the president.

3 Q

4 At that time was Williams part of some larger company,
to your knowledge?

5 A

Yes, we were.

Q

What company was that?

6 A

That was Seeburg.

7 Q

8 This Nicastro you mentioned, what association did he
have with Williams or Seeburg?

9 A

10 He was the Chairman of the Board for Seeburg Corpora-
tion.

11 Q

The parent of Williams?

12 A

Parent of Williams.

13 Q

14 When Mr. Mittel and Mr. Stern spoke to you in 1975 about
the need for Williams to get into solid state machines, did
15 you agree or disagree with that?

16 A

I agreed.

17 Q

Why did you agree, sir?

18 A

19 Because in the evolution of anything, the latest tech-
nology comes along, why, you want to jump into it if possible
20 to beat the competition, and it is even more so in the coin
21 machine business, which is an amusement type of business..

22

23 Now, if you have something novel, better than
somebody else, why, you jump into it.

24 Q

25 What was coming along in that period that led you to
that view?

Gregg - cross

1 A The solid state devices and machines were coming along
2 at that period, and all the distributors and everybody you
3 talked to felt that was the signs of the times of the future.

4 Q Wasn't it true that during that period you were seeing
5 a rather rapid drop in the price of the solid state components
6 in the electronics field?

7 A The price of the solid state devices has been on a
8 constant down curve for -- well, since Bell first came out with
9 it, actually.

10 Q About 1948?

11 A Somewhere in that range, right.

12 Q So over the years there has been new components, is
13 that correct?

14 A Yes, there has been.

15 Q Their price has steadily dropped?

16 A Yes.

17 Q Actually, those price drops have been on the orders
18 of magnitude, haven't they? They have really been very
19 substantial.

20 A Yes, they are.

21 Yes, they are. They still are today. I mean,
22 you order a million pieces, you are going to get a much better
23 price than if you order two pieces.

2

24

25

es.

1 Q But something like a transistor, which might have cost
2 several dollars back in 1950, in 1970 it didn't cost anything
3 like that, did it?

4 A Nowhere near. I paid \$25 for one in 1950, and I have
5 looked in the catalog here just recently and that thing can
6 be gotten for \$4, and the dollar value has changed con-
7 siderably since then.

8 Q Did I understand correctly that National Semiconductor
9 was supplied a Grand Prix game by Williams?

10 A Yes.

11 Q Why didn't Williams offer for sale, if you know, sir,
12 the solid state version of the Grand Prix game as built by
13 National Semiconductor?

14 A That question I can't answer. That you would have to
15 ask Mike Stroll.

16 Q But that was a decision made, to your knowledge, by
17 Mr. Stroll?

18 A Yes.

19 Q Mr. Stroll joined the company when?

20 I am sorry. Let me withdraw that.

21 I believe it was your testimony he came first at
22 the corporate level, I think you put it.

23 A Yes, yes.

24 Q What did you mean, "the corporate level"?

25 A He came to work for Lou Nicaastro as his technical

Gregg - cross

2562

1 adviser.

2 Q So he was not working for Seeburg or Williams but at
3 some higher level?

4 A Well, he was on the payroll of the Seeburg Corporation,
5 his corporate office that he worked out of.

6 Q Isn't it so that shortly after Mr. Stroll came to the
7 organization at the corporate level, he hired some people to
8 work with him or for him, did he not?

9 A Yes.

10 Q Do you know the people that he hired?

11 A Yes, a few of them, I do.

12 Q Was David Poole one of them?

13 A David Poole was heading up the project.

14 Q Kenneth Fedesna?

15 A Kenneth Fedesna.

16 There was another guy.

17 Q Ronald Crouse?

18 A Crouse, that's it.

19 Q Do you know, sir, whether those people hired by Mr.
20 Stroll had any background in digital solid state electronics?
21 A I would presume they did. I couldn't swear to it one
22 way or the other.

23 Q But that was the reason they were hired, wasn't it?
24 A Right, right.

25 Q Didn't there come a time when Mr. Stroll made a decision

1 that Williams was not going to go outside to design its
2 solid state game but was going to design it and develop
3 it itself?

4 A I have no knowledge of that.

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1 Q Well, isn't that what Mr. Poole and Mr. Fedesna and
2 Mr. Crouse did?

3 A Yes, but when this took place or what, I don't know.

4 I assume when the people showed up that this was
5 their project, to develop a machine that we were going to
6 use, just as Seeburg was going to do, too. The Seeburg
7 machine got bombed out, and that was it.

8 Q Let's talk about that.

9 The people at Seeburg, that is the operation that
10 used to be here at 1500 North Dayton in Chicago?

11 A Correct.

12 Q Do you know the people at Seeburg who worked on the
13 Seeburg version of the solid state game?

14 A Yes. Tony Miller was one, and then Cas Dabrowski was
15 another, and another fellow -- I cannot remember his name.
16 They worked on the solid state machine.

17 Q Do you know, sir, whether those people had any background
18 or experience in computer technology?

19 A Their backgrounds, I have no way of knowing.

20 Q All right, sir.

21 Did you ever actually see a pinball game with an
22 electronic circuit in it designed by Rockwell?

23 A Yes.

24 Q Do you know, sir, how that circuit operated?

25 A Basically, that is about it.

1 Q Isn't it a fact, sir, that problems that existed in the
2 Rockwell game when you saw it were problems at what
3 engineers call the debugging level?

4 A Yes. Well, you are debugging as you are going down the
5 production line, too.

6 Q Debugging --

7 A That is right.

8 Q -- very frequently continues --

9 A That is right.

10 Q -- after you think you have completed a design, and
11 you are actually making it out in the factory, doesn't it?

12 A That is right.

13 Q That is where the Rockwell game was, wasn't it?
14 It was at the debugging level?

15 A Yes.

16 Q There was a microcomputer in there?

17 A Yes.

18 Q Essentially, it functioned as a pinball game?

19 A Yes.

20 Q That was true of the National Semiconductor game as well,
21 wasn't it?

22 A We only put together one National controller, and that
23 never even left the engineering department.

24 Q But it worked as a pinball game?

25 A Yes. It worked very well.

1 Q

2 So isn't it --

3 THE COURT: Which one is that?

4 THE WITNESS: The National.

5 MR. GOLDENBERG: National Semiconductor.

6 BY MR. GOLDENBERG:

7 Q

8 Isn't it true, sir, that at one point you understood
9 that the reason Mr. Stroll scrapped the Rockwell game was
10 because he did not like the sounds it generated?

11 A He did not tell me that. So I do not know.

12 I have heard that bandied around, but the sounds --
13 you can change the sounds of a machine very easily. That
14 is no big problem. Audio is easy to work with, you know,
15 generate some different tones.

16 Any kind of noise you want to make, why, it is not
17 too difficult to do.

18 Q Now, the Rockwell game -- I am sorry. Let me withdraw
19 that.

20 The game sent to National Semiconductor was the
21 game, Grand Prix?

22 A Yes.

23 Q Now, up until that time, Williams had been building
24 Grand Prix as an electromechanical game, had it not?

25 A Yes.

17-1

1 Q

2 And therefore wasn't one of the reasons why the National
3 Semiconductor version of Grand Prix was not chosen, because
4 Williams had come to the end of the run of Grand Prix as a game
5 at all; it had had its day in the market.

6 A

7 Well, that was one of the reasons, and that it would
8 serve no purpose to complete the rest of the hundred units
9 that we had ordered.

10 And they never, you know, made any more than
11 the one that we put together in engineering.

12 Q Several thousand electromechanical Grand Prix had
13 already been built --

14 A Yes.

15 Q -- and gone out into the market.

16 A Yes.

17 Q And the market for Grand Prix, electromechanical or
18 solid state, had been saturated. Isn't that correct?

19 A That was my contention.

20 Q That's -- all right, you believed that, didn't you?

21 A I sure did.

22 But they claimed that a solid state machine
23 wasn't the same as the electromechanical machine; yet, the
24 electromechanical machine was what the solid state machine
25 was trying to duplicate.

THE COURT: What was your understanding of the
advantages that would be involved in a microprocessor type

Gregg - cross

2368

1 machine that duplicated the electromechanical machine?
2

3 THE WITNESS: Well, eventually, your Honor, the
4 solid state machine has less moving parts. The only moving
5 parts are the parts you see around the playfield. Now, these
6 would be the most subject to wear and tear.

7 But the controlling circuits and everything
8 in there should, you know, stay stable once they were
9 established.

10 And if the circuitry was engineered properly,
11 why, that machine should run, who knows, until Kingdom Come,
12 I imagine, because there is no wear and tear on these devices.
13 BY MR. GOLDENBERG:

14 Q And that was a known quality of solid state.

15 A Yes.

16 Q Now, I believe you testified that at one point there
17 was a Bally solid state pinball game on Williams' premises.

18 A Yes.

19 Q The game Night Rider.

20 A Yes.

21 Q What premises was it on, where was it? Was it at 1500
22 North Dayton, or was it at North California?

23 A 3401 North California in the engineering department.

24 Q Now, at this time had Mr. Stroll entered the employ of
25 Williams or Seeburg?

A Yes.

Gregg - cross

1 Q

2 A And he was working over on North Dayton, wasn't he?
Yes.

3 Q

4 And that's where Mr. Poole and these other engineers
were working with him?

5 A

Yes.

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1 Q Do you have any knowledge, sir, of any concerted effort
2 on the part of those gentlemen or anyone else you can think
3 of to copy Bally's Night Rider game?

4 A To my knowledge, no.

5 Q What they did was to have a competitor's product on
6 the premises, didn't they?

7 A Right, for evaluation.

8 Q And that's very common in the amusement game industry,
9 isn't it?

10 A Every industry.

11 Q Every industry.

12 When you worked for Bally that was done there,
13 wasn't it?

14 A Yes.

15 Q I'm sorry, sir?

16 A Yes.

17 Q Did you ever get to meet with Mr. Fedesna and Mr. Poole?
18 A No.

19 Q You never met with them?

20 A No.

21 Q In connection with this Night Rider, you've said you
22 measured something on the game. What did you measure, sir?

23 A I measured the strobe times on the switches to deter-
24 mine how fast the machine was running.

25 Q What do you mean by the strobe time on the switches?

Greg - cross

2371

1 A Well, the processor sends out a pulse in units of 8
2 in a string, and the time of that pulse is when that par-
3 ticular switch that it is hooked to will be the time that it
4 can be touched and function properly. And the other times,
5 why, it's dead.

6
7 So I wanted to know how fast they were running,
8 because I know the contact time on a switch, and if this
9 overlapped that, then I know the switch would register.

10 Q How did you go about that, sir?

11 A I had Jim Klein hook up the scope on to the switches
12 and we checked it.

13 Q What did you do with the results of that test?

14 A Filed it.

15 Q Did you give it to Mr. Stroll?

16 A No.

17 Q You didn't give it to --

18 A Nobody.

19 Q Gave it to nobody.

20 Did you ever see Mr. Stroll or his staff of engin-
21 eers make any measurements on this Night Rider game?

22 A No, I didn't see it.

23 Q Now, it's a fact, the Night Rider game was only there
24 for a while. Isn't that true?

25 A It was a short period, yes.

Q Borrowed from a friendly distributor and returned to him?

Greg - cross

2312

1 A

Yes. Standard practice.

2 Q

Standard practice in the industry, isn't it?

3 A

Right.

4 Q

Now, this Bally solid state Bow and Arrow game that you went to see with Ray Macie in February of '76, do you recall testifying about that, sir?

7 A

Yes. Yes.

8 Q

Isn't it a fact, sir, that what that game was was a very early Bally prototype put out on a test location?

10 A

I was assuming it was such at the time, yes.

11 Q

Do you know Bally's first commercial solid state pinball game?

13 A

No.

MR. GOLDENBERG: I have no further questions of this witness, your Honor.

Gregg - cross

2373

1 MR. LYNCH: May it please the Court, just a few questions
2 on behalf of Gottlieb.

3 BY MR. LYNCH:

4 Q Mr. Gregg, you testified that while you were at Bally,
5 you encountered a TTL game called Big Valley.

6 A Yes.

7 Q You mentioned there was a Texas Instruments affiliation
8 with that game.

9 A Well, it was put together by Texas Instruments.

10 Q Do you recall whether it was put together -- does the
11 name George Bronk ring a bell in connection with that game?

12 A No, it does not. I have no real knowledge of that
13 outside of John Britz came in and told me to go look at the
14 machine, what I thought of it, and what it would cost us, and
15 that was the extent of my knowledge of that machine.

16 Q Do you remember when that machine was at Bally or when
17 it was first at Bally?

18 A Big Valley was one of the first electromechanical
19 machines that I had produced when I went to Bally. So it had
20 to be the program started at that point, which would have
21 made that, what, '69 sometime or early '70s.

22 Q So it was a very early game, much earlier than these
23 other efforts with microprocessors?

24 A Yes.

25 Q With respect to the situation at Bally in 1974 at the

18,1,2

Gregg - cross

2374

1 time you left, what was your relationship, if any, with
2 gentlemen then employed by Bally, like Mr. Bracha and Mr.
3 Englehardt?

4 A. Mr. Bracha when I left, he had been made the -- what was
5 his -- I don't remember what his title -- anyway, he was
6 supposed to be my superior, and I just couldn't get along with
7 that individual. He made my hair stand on end 40 feet away.

8 Why, I don't know. It was just body chemistry.

9 THE COURT: What was his charge?

10 THE WITNESS: I don't know. I wish I could have men-
11 tioned it.

12 THE COURT: He must have been up around 1,900.

13 THE WITNESS: He must have been, at least.

14 THE COURT: Or 19,000, I mean.

15 BY MR. LYNCH:

16 Q At the time was it generally understood at Bally,
17 that is, before you left, that an electronic microprocessor
18 controlled pinball game would come along eventually?

19 A I have no knowledge of anything. That was never
20 discussed with me or anybody that I know of.

21 Q With respect to the discussion you had about the Aztec
22 game, Mr. Gregg, you indicated that the first time you went
23 to Rockwell that there was some glitches in the game, if you
24 will --

25 A Yes.

1 Q -- that required debugging, correct?

2 A Yes.

3 Q In September 1976, however -- I believe Mr. Tone asked
4 you to look at this memorandum, Plaintiff's Exhibit 236.
5 That indicates that as of that time, as of September 1976,
6 there was an Aztec game on hand at the Williams.

7 Is that what it implies?

8 A Yes.

9 Q And that it was working at least suitable enough to
10 warrant a field check, correct?

11 A Yes.

12 Q At that time this memo that you co-authored indicated
13 that you felt that Rockwell certainly had the ability to
14 design an adequate game and help Williams in that regard,
15 correct?

16 A Absolutely.

17 Q One other point, Mr. Gregg.

18 These games were four-player games. That is what
19 Williams was interested in, correct?

20 A Yes.

21 Q Is that somewhat more complicated than a two-player
22 game?

23 A Not terrifically. It basically involves two more
24 readouts actually on the machine.

25 Q And keeping track of two more scores.

Gregg - cross
redirect

2316

1 A

And keeping two more scores, right.

MR. LYNCH: No further questions, your Honor.

REDIRECT EXAMINATION

BY MR. TONE:

5 Q

Just a few questions on redirect, Mr. Gregg.

After the evaluation you made, as reflected in
your memorandum of September 3rd, 1976, Mr. Gregg, I
believe you testified on direct that Rockwell developed some
problems with PROMs, is that correct?

A. Yes.

Q What was the nature of those problems?

A. It had something to do with the chip or the mask, and
they had to make a new mask for one of the PROMs on the
machine.

Gregg - redirect

1 Q

2 After that letter was written, did there ever come a
3 time when Rockwell had a problem, a Rockwell machine, had a
4 problem of withstanding static discharge?

5 A

6 Yes.

7 MR. LYNCH: Objection, your Honor. This is
8 exceeding the scope of direct. Now we are getting into an
9 entirely new area.

10 MR. TONE: I thought it was direct, your Honor.

11 I think Mr. Lynch questioned the witness about
12 the state of development of the Rockwell machine, and this is
13 redirect addressed to that.

14 THE COURT: All right, overruled.

15 MR. TONE: Let's see. I think the witness answered
16 the question perhaps before Mr. Lynch's objection came in.

17 May we have it read back, Miss Reporter?

18 (The record was read by the reporter.)

19 BY MR. TONE:

20 Q Can you tell us about that?

21 A We had the machine, and it was standing in the game
22 room where the receptionist is, and anybody who comes in, they
23 want to play it, why, they can.

24 Now, the game bombed out on us a couple of
25 times. By bombed out, I mean the machine just went dead.

After a lot of tracing around and hemming and
hawing, why, it was decided it was the static, and the room

Gregg - redirect

1 that it was in had a rug, as this place does, and you build up
2 a good enough charge, and finally Chris Otis learned about it,
3 and then he was having fun. He would rub his feet and
4 shuffle his legs and zap the machine and knock it out of
5 commission.

6 Q Mr. Lynch or Mr. Goldenberg inquired about the inspec-
7 tion of the machine, which I think you said was located at
8 the California Avenue premises?

9 A Yes.

10 Q When Mr. Stroll examined the machine and played it, did
11 he come to that location to do so?

12 A Yes.

13 Q You mentioned a Mr. Crouse and a Mr. Poole.

14 A Yes.

15 Q Did those gentlemen also examine the machine?

16 A Yes.

17 Q And play it?

18 A Yes.

19 Q At the California Avenue premises?

20 A Yes.

21 Q There were schematics, you testified, for the machine.

22 Did either of those gentlemen look at the
23 schematics?

24 A Yes. Dave Poole borrowed them.

25 Q And took them with him?

Gregg - redirect

1 A Yes. I was in my office. He came and asked me for
2 them. I gave them to him, and he returned them to me a while
3 later.

4 Q How much later?

5 A Hour, two hours.

6 MR. TONE: May I confer for a moment?

7 THE COURT: Yes.

8 (Brief interruption.)

9 BY MR. TONE:

10 Q Did you ever evaluate the operation of the Big Valley
11 game?

12 A Yes.

13 Q What was your conclusion about how it operated?

14 A It didn't.

15 Q It was in your judgment not --

16 A It was not a functional playing machine.

17 MR. TONE: All right, no further questions on
18 redirect, your Honor.

19 MR. LYNCH: No questions.

20 THE COURT: All right, thank you. You may stand
21 down, sir.

22 THE WITNESS: Thank you.

23 (Witness excused.)

24 MR. TONE: Our next witness is William Englehardt,
25 your Honor. He is waiting in the witness room.
(Brief interruption.)

4 1
2 MR. TONE: May I have a moment with counsel?

3 THE COURT: Yes.

4 (Brief discussion off the record between counsel.)

5 THE CLERK: Please raise your right hand to be
6 sworn.

7 (Witness sworn.)

8 THE CLERK: Please be seated.

9 WILLIAM H. ENGLEHARDT, PLAINTIFF'S WITNESS, DULY SWORN.

10 DIRECT EXAMINATION

11 BY MR. TONE:

12 Q Please state your name and spell your last name.
13 A William H. Englehardt.

14 It is E-n-g-l-e-h-a-r-d-t.

15 Q Where do you live?

16 A I live in Wood Dale, 465 West Dominion.

17 Q Are you employed by Bally Manufacturing Corporation?
18 A Yes, that is right.

19 Q What is your position there?

20 A I am manager of corporate engineering.

21 Q Do your responsibilities include design of electronic
22 equipment?

23 A Yes, they do.

24 Q How long have you been working in the design of elec-
25 tronic equipment at Bally?

A Since I came there, which was March of '74.

1 Q And have those design responsibilities included work on
2 electronically controlled pinball games?

3 A Yes, they have.

4 Q Were you hired to do a specific task initially for
5 Bally?

6 A Yes. I was hired to bring a microprocessor based de-
7 sign to their electromechanical product line.

8 Q Who at Bally interviewed you and --

9 A That was Frank Bracha.

10 Q And is it your understanding that he was the person
11 who decided to hire you?

12 A Yes, mm-hmm.

13 Q Will you state your educational background after high
14 school.

15 A I graduated from IIT with a Bachelor of Science in 1962.
16 I took about 20-some odd hours of graduate school
17 after that, at IIT, most of that associated with computer
18 design.

19 Q Will you briefly describe your employment history before
20 you came to work for Bally.

21 A Sure. From 1962 to 1969 I worked for Stewart Warner
22 Electronics as an electronics design engineer.

23 From '69 until '74 I worked for Zenith Radio in
24 two different capacities: one, in a, it was called special
25 products division of Zenith which was mostly military equip-

1 ment, and then the last year of that period I worked in
2 something called Advanced Development, color T V.

3 Q Prior to your employment by Bally, had you had exper-
4 ience in designing computer-type circuitry?

5 A Yes, mm-hmm.

6 Q Describe that experience briefly.

7 A Well, I think it came probably two ways: design of
8 hardware at Stewart-Warner electronics in terms of using
9 both discrete parts and ICs in the '60s, shift registers,
10 adders, and things like that, counters.

11 I was also going to graduate school at the same
12 time, and a lot of the classes that I was taking involved
13 design of computer logic.

14 Q Had you had any experience with pinball games before
15 you came to Bally?

16 A No, not other than playing them.

17 Q After you got there, how did you go about learning
18 about pinball games?

19 A I got a schematic and I started looking it over, and
20 looked at the machine, and talked somewhat to the people
21 there about it.

22 Q What was your very first assignment at Bally?

23 A The first thing I was supposed to do was provide a
24 microprocessor based design for a slot machine.

machine

Englehardt - direct

Q I'm not sure we didn't skip over identifying the date when you first came to Bally.

A It was March of '74, I think it was the 23rd.

Q How long did you work on the first assignment?

A I worked on the slot machine job until late September, October, at which time I was told that that task was to be transferred to another group.

Q So you never finished that task?

A That's right.

Q And were you reassigned to do something else?

A Yes. We were sort of redirected -- we were redirected to provide a microprocessor based pinball machine.

Q And who directed you to do that?

A Frank Bracha.

Q And to whom did you -- did you then commence work on an electronic pinball project?

A Yes.

Q And to whom did you report?

A Frank Brancha.

Q At the time you began working on that project were you informed about any other design work that had been done by Bally personnel on an -- any electronic pinball game project?

A No, I didn't know of any.

Q At that time were you informed of any development work on an electronic pinball game project by anybody outside

1 Bally?

2 A Yes. I was told by Frank that he had been out to MCI,
3 I guess it was, to see their microprocessor based pinball
4 game.

5 Q And did he tell you anything more about that?

6 A Well, he came back and he said that he had seen it,
7 that it used a 4004, that he had played it, that it operated.

8 He had some pictures and some handout
9 materials that he had been given.

10 He might have told me some more about what
11 he saw inside it, but I'm not too sure I know exactly what
12 it was he told me.

13 Q Referring to Plaintiff's Exhibit 32, which is already
14 in evidence, do you recognize that?

15 MR. TONE: That, your Honor, is the brochure the
16 evidence shows was handed out at the demonstration.

17 BY THE WITNESS:

18 A Well, you know, I can't swear to it, but I'm pretty
19 sure this is what he brought back.

20 BY MR. TONE:

21 Q That looks like what he showed you at that time?
22 A Yes, um-hmm.

23 Q Did Mr. Bracha ask you to do any particular task
24 relating to the MCI project?

25 A Yes. The first thing he did when he got back was, he

Englehardt - direct

had been handed -- he was interested in the cost figure that had been quoted to him, that there was a \$200 savings, I think it was.

And so he was anxious -- since we didn't know anything about the way those cost figures had been generated, he was anxious that he should develop in-house some sort of confirming -- or, our own feeling about what sort of cost benefits might result from using that design.

And so I set out to do that.

MR. TONE: Excuse me, your Honor, for one moment.

(Brief interruption.)

BY MR. TONE:

Q I show you Plaintiff's Exhibit 72 and 73, Mr. Englehardt, and I ask you whether you recognize those documents?

A Yes. These were things that I put together in an effort to come up with these cost figures.

Q What is 72?

A I'm sorry, what?

Q What is Exhibit 72?

A I don't have one -- oh, I see, I see 72.

Okay. That's a block diagram that I put together in an effort to identify those components that would be necessary in any design of this type.

The idea was, I would identify the parts first, and then I was going to put a cost on them and then estimate manufacturing costs and other factors involved with it.

1 Q On what information did you base this figure?

2 A Well, it was based on several things. First of all,
3 I knew that it was a 4004 system, or at least that is what
4 Frank had told me, and I then made certain assumptions.

5 I knew how many inputs and how many outputs the
6 system I thought would have to have because it was a Flicker
7 game and that information was available to me at Bally.
8 I made some assumptions about how much program memory would
9 be required.

10 In fact, the assumptions are actually listed over
11 here on the side.

12 I just assumed that the logic that would be used,
13 the glue kind of logic or whatever you want to call it,
14 would be C-MOS.

15 That's about it.

16 Q In whose handwriting is the list under the word
17 "assumed"?

18 A That is Frank Bracha's.

19 Q Did you also prepare 73?

20 A Yes.

21 Q You prepared these when?

22 A It was about October or so of '74.

23 Q I show you Plaintiff's Exhibit 74, which purports to
24 be a handwritten memorandum.

25 Do you recognize the handwriting?

1 A. Yes, it is mine.

2 Q. Did you prepare that document then?

3 A. Yes.

4 Q. When?

5 A. In that October '74 time period.

6 Q. For what purpose?

7 A. In response to his request to me to work up an
8 independent cost analysis verifying or refuting this \$200
9 figure.

10 Q. Did you submit that document to anybody?

11 A. I gave this handwritten document to Mr. Bracha,
12 and then he took that and supplemented it somewhat and pro-
13 duced a report that he forwarded to management at Bally.

14 Q. The handwritten document refers to certain attachments.
15 Can you tell me whether those attachments included what we
16 have now marked as Exhibits 72 and 73?

17 A. Let me find the reference here.

18 Yes, okay, you mean since material -- okay, the
19 necessary lists were generated based on a preliminary
20 design layout -- that is that thing we were just looking at--
21 and observations of Bally personnel and a photograph, yes.

22 Q. Do you recall whether you attached to your memorandum
23 the brochure, which is Plaintiff's Exhibit 32, which you
24 looked at a few minutes ago?

25 A. Do I recall if I attached that to the handwritten

Englehardt - direct

1 memorandum?

2 Q Right.

3 A Well, I don't really recall that. I am not sure.

4 Does it say in here?

5 I might have done something like that.

6 Q All right. Were your draft and -- I am sorry. Let me
7 show you one more document before I ask you that question.

8 Plaintiff's Exhibit 131 purports to be a memorandum
9 dated October 4th, 1974 to Mr. Lally from Mr. Bracha.

10 Do you recognize that?

11 A Well, yes, I think this pretty much is the response that
12 he wrote, incorporating this material that I had worked up.

13 Q Did you see that at or about the time it was prepared?

14 A Yes, I think I did.

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1d.

1 Q Can you tell us whether Plaintiff's Exhibit 131, which
2 you have before you, and your handwritten memorandum, which
3 you have described, have been maintained by Bally since
4 they were written and in the ordinary course of Bally's
5 business?

6 A Yes.

7 Q Tell us in summary what you knew about the MCI elec-
8 tronic pinball game, which we call Flicker here, at the
9 time you began your work.

10 A At the time I began in October, you mean?

11 Q Right.

12 A Well, I think I was reasonably familiar with how it
13 should function.

14 I am trying to remember if I had written some
15 programs for it or not at that point.

16 Well, I don't remember for sure, but certainly I
17 had been studying it since I had come in there in March.
18 I had also looked at the Bally Alley job, which had been
19 done at Bally, and that was 4004 microprocessor. I went
20 over those schematics.

21 Well, I think I was somewhat familiar with the way
22 it operated just because it was, to a certain extent, simi-
23 lar to just a computer.

24 Q By "it," what do you mean?

25 A The 4004 was.

Englehardt - direct

2390

1 Q So you were familiar with the 4004 chip?

2 A Yes, somewhat.

3 Q What did you learn from Mr. Bracha about the MCI game
4 which he had seen operate, according to his memorandum that
5 we just looked at, dated October 4?

6 A Well, I don't really remember specifically too much.

7 Say I remember that he told me it was a 4004. I
8 think I remember he told me he had played it. He might have
9 told me how many printed circuit boards were up there.

10 I guess that is about it.

11 Q Did he have a photograph of part of the game?

12 A Yes, when I did this thing, he had given me some sort
13 of a photograph. I think I remember scaling it because I
14 was trying to determine what sort of circuitry was on it
15 in order to prepare this cost proposal.

16

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1 Q You have not seen that photograph today, have you?

2 A I cannot really be sure. I do not know.

3 Q You cannot identify the photograph from anything you
4 have been shown in preparation for testifying?

5 A That is right.

6 Q How long did it take after you began the project in
7 October, 1974 to develop a working prototype?

8 A We had a demonstration in May of '75 for Bally's
9 management. We called that Boomerang.

10 Q By the MCI game, I mean to refer to the game that you
11 saw in September 19 -- or, rather, that Mr. Bracha saw in
12 1974, which we have been calling Flicker.

13 A Yes.

14 Q By that time it was -- we will call it the Flicker
15 electronic pinball game that was seen in Milwaukee. That is
16 what I am referring to as the MCI game.

17 A Yes.

18 Q Was there any field testing of the game that you devel-
19 oped and showed to management in May of 1975?

20 A No, no field testing.

21 Q What happened after May of 1975?

22 A Well, management decided to allow us to go ahead with
23 the next phase of the thing, and the next phase of the pro-
24 gram was to build 20-some-odd prototypes. We were to put
25 those out on field tests.

Englehardt - direct

2392

1 I think we ended up building about 22 or 23. We
2 put about 18 or 19 out on field tests.

3 Q What were they called?

4 A That was Bow and Arrow.

5 The plan there was to -- we would take an
6 electronic Bow and Arrow and an electromechanical Bow and
7 Arrow, set them side by side in a location, and then we
8 were going to compare the income from the two, and we did
9 that.

10 Q When was a production model first made?

11 A The first production game was Freedom, and it was
12 December of '76.

13 Q How long were those Bow and Arrows out on the field?

14 A Well, let's see. I think they started going out in
15 about December of '75, and I would say that we started --
16 probably started bringing some of them back in anyway. Late
17 summer would be sort of an estimate. It might have been a
18 little later. It might have been earlier.

19 But they were certainly out there for, I would say,
20 more than four or five months.

21 Q I take it was after that that it was concluded to go
22 ahead with the production model?

23 A Yes, when we saw the earnings figures.

24 Q The development period extended over a period of about
25 how long?

Englehardt - direct

- 3 -

1 A Well, from October of '74, if you want to say, until
2 December of '76.

3 Q During that period, how many Bally engineers worked
4 on the project?

5 A Well, it varied, but I suppose it averaged something
6 like three or four full-time people.

7 Q Over that period, did anyone work full-time the whole
8 time?

9 A Yes. Ollie Svilans and myself were essentially on it
10 throughout the course of the job.

11 Q Who was in charge of the project?

12 A I was.

13 Q Your superior was Mr. Bracha?

14 A That is right.

15 Q He had responsibility for this.

16 Did he have responsibility for other projects as
17 well?

18 A Yes, he did.

19 Q In the course of this development work, did you encounter
20 any problems?

21 A Oh, yes.

22 Q Can you list those for us or give us a --

23 A Yes.

24 Q -- brief summary?

25 A Well, we had both hardware and software problems.

1 In terms of the software problems, we had the
2 usual kind of goofs in the program. We had re-entrancing
3 problems. We had loading problems in terms of a per cent
4 execution time and things like that where we were over-
5 burdening the processor.

6 In terms of hardware problems, we had transistors
7 that were burning out in the solenoid driver circuits. We
8 had five volt regulator oscillations.

9 We had a lot of noise problems. We had high
10 voltage transistors and the display circuits that were
11 burning out.

12 Q Can you say which of these problems were the most
13 significant?

14 A Well, probably the noise problems.

15 Q Was it necessary to solve the noise problems in order
16 to have a practical machine?

17 A Yes, I think so.

18 In fact, Mr. Bracha and I had had a lot of conver-
19 sations, almost from the start, about the reputation that
20 some electronic games had at that time for problems with
21 noise and, in particular, static discharge.

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Englehardt - direct

2395

1 Q Now, were these electronic pinball games?

2 A No. These were video games, pawn type games primarily
3 that we were talking about.
4

5 And the reputation was that they were giving away
6 free games.

7 And I had it sort of delivered to me, although
8 actually we just decided that we would try very hard to
9 prevent that from happening in this machine, and that it was
10 an important parameter, and that we should do whatever had
11 to be done to prevent that.

12 So that was -- it was sort of a big deal.

13 Q Had you had any, yourself, had any particular experience
14 prior to the time you came to Bally in dealing with
15 electrical noise problems?

16 A Yes, I had, by virtue of the fact that I'd worked
17 really the majority of that time in military electronics.

18 And the military requires that the equipment be
19 subjected to certain tests, and that you demonstrate, number
20 one, that it is not susceptible to external noise and,
21 number two, that it doesn't radiate external noise above
22 certain levels, so that it will be able to function with
23 other systems.

24 In addition to that, particularly the circuitry
25 that I worked on when I was in military electronics was all
digital, and it was reasonably high speed, which means that

1 the internal noise that's generated -- and the external,
2 really, from that standpoint, is particularly -- it's at high
3 er levels whenever you have high-speed circuitry.

4 So I think I had a good education in it.

5 Q Mr. Englehardt, did all of Bally's production model
6 electronic pinball games employ the same basic design?

7 A Yes, um-hum.

8 Q And can you tell me the name of the first electronic
9 coin operated pinball game sold by Bally?

10 A That was Freedom.

11 Q I show you Exhibits 420-B to -D, and I ask whether these
12 are the schematics for the type of electronic control used
13 in Freedom?

14 A Yes, uh-huh, they are.

15 Q And I show you Exhibits 420-A and 430.

16 420-A is entitled "Electronic Freedom," and on the
17 second page "Installation and General Game Operation
18 Instructions."

19 And 430 is entitled "Bally Electronic Pinball Games,
20 Theory of Operation."

21 Would you look at those.

22 A (Witness reviewing documents)

23 Okay. Well, 420-A looks pretty much like what we
24 did. And this "Theory of Operation," 430, is a document that
25 I remember.

1 Q Does 430 correctly describe the theory of operation of
2 the Bally line of electronic pinball games?

3 A Yes.

4 Q And is what it says generally applicable to all of those
5 games?

6 A Yes, um-hum.

7 Q And is the operation of the electronic control system in
8 Freedom, which is described in 420-A, typical of the operation
9 of electronic control systems in the other Bally games?

10 A Yes, it is.

11 Q Bally pinball games?

12 A Yes, it is.

13 Q To make one thing clear that may not be clear: I have
14 occasionally used the term MCI game. I should have said Dave
15 Nutting Associates game, because -- but that's a matter not
16 within your knowledge -- but when I made that reference I
17 was intending to refer to the electronic Flicker game
18 developed in Milwaukee by Messrs. Frederiksen and Nutting.

19 Did you understand me to mean that?

20 A Yes. I think we used maybe all of those terms, frankly,
21 when we used to talk about it somewhat interchangeably anyway.

22 Q All right.

23 MR. TONE: May I have a moment, your Honor?
(Brief interruption.)

24 MR. TONE: No further direct.
25

1 Oh, I should offer Exhibit 72, 73, 74 and 131, and
2 I do so, your Honor.
3

4 THE COURT: All right, they're received.

5 (Said exhibits, marked 72, 73, 74 and 131 for
6 identification, were received in evidence.)

7 MR. TONE: May I have a moment, your Honor, to make
8 sure that I offered everything.

9 THE COURT: Yes.

10 (Brief interruption.)

11 MR. TONE: I may not have offered -- I think I did not,
12 Exhibits 420-B and -D, and Exhibits 420-A and 430, and I offer
13 those.

14 THE COURT: All right, they're received.

15 MR. TONE: 420-B, -C and -D. I'm sorry for the
16 confusion.

17 THE COURT: They're received.

18 (Said exhibits, marked 420 B, C, D and 430 for
19 identification, were received in evidence.
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25

Englehardt - cross

CROSS EXAMINATION

BY MR. GOLDENBERG:

Q Mr. Englehardt, do I understand it correctly that after Mr. Bracha had inspected this game at MCI, Nutting Associates, he told you it was a 4004 base system?

A Yes.

Q And asked you to come up with comparative costs, is that correct, sir?

A Yes.

Q In order to do that, you first prepared this -- I don't know what exhibit number it is.

THE COURT: 72.

BY MR. GOLDENBERG:

Q (Continuing) -- Exhibit 72, this schematic diagram or block diagram?

A Yes.

Q That is all you knew, was that it was a pinball game, the Flicker game, and a 4004 base system, and you were able to prepare this block diagram, is that correct?

A It was my estimate of what might be in there.

Q Can you agree with me that -- let me withdraw that, sir.

What does that show? Let's go at it that way.

A I don't know what you mean.

Q What kind of system are those --

Englehardt - cross

1 A

What is on there?

2 Q

I assume that because it is a pinball game, you are intending to control lamps and displays, is that correct?

3 A

Yes.

4 Q

Where are they shown in the diagram?

5 A

Well, the lamps and the displays aren't shown on this diagram.

I think that at least when I was making this diagram, it was meant to be the controller section of the diagram, and there is a lot of the interface that isn't here.

Q Where is the outputs to control lamps and displays?

A Well, I think, for instance, let's see.

At the lower right-hand side, where you see numbers that are marked "LED segment," "Digit Select," and "Digit Select," those are meant to be the outputs to some sort of a display system.

Q That would be the numerical displays?

A Right, and the outputs just listed above that, where it says 24 outputs, along with the 24 outputs down below are meant to satisfy the -- and I can't see just what it says down here at the bottom, but there is something similar going on down there -- are meant to supply the output requirements for driving lamps and things of that nature.

All right, sir.

Q Again without the interface circuitry.

Englehardt - cross

1 Q How about switches, where were the switches going to
2 be?

3 A I get the feeling that -- let me see here.

4 There is something missing down here at the
5 bottom. In fact, I see that there is an arrow marked "Anode"
6 to these MC14512's. I get the feeling they might have been
7 coming in through that.

24-2

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1 Q If we take the 14042 buffers, which are in the center of
2 the drawing and have the vertical bracket connecting them,
3 what were they?

4 A It was a C-MOS output device. Frankly, I don't
5 really remember. It looks like it is a four-stage latch
6 perhaps.

7 Q So each one of those things has four outputs, is that
8 it?

9 A Yes, I imagine. That is the way it looks to me now.

10 Q The same ones, the 14042, you have six more of them
11 across the bottom, and they have a total of 24 outputs also,
12 is that correct?

13 A Yes.

14 Q Would it be correct that you intended to put the
15 numerical display in a matrix here?

16 A It pretty much looks that way because it looks like
17 the segments are sitting out there ready to be multiplexed
18 against the digit select lines, and I see that it seems to
19 indicate that it was intended there would be 13 digits.

20 I don't know exactly where that came from, but I
21 would guess that maybe the Flicker or the system that Frank
22 saw had that number of digits.

23 Q If I look at the electromechanical Flicker, I think I
24 see 10 digits, but there is also some additional digits on
25 the credit, isn't there?

2403

1 A Right.

2 Q I think those were 2, so that would make that 12 --

3 A Right, but those numbers all bounce around from time
4 to time, frankly.

5 I don't know. I don't remember now what we had in
6 mind at that time, but it could have been that we had
7 another number up there for the ball, number of the ball in
8 play instead of lighting up lights to do it. It could have
9 indicated the number of coins, a lot of things.

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Englehardt - cross

1 Q So even without knowing anything about what had been
2 done in Milwaukee other than the use of the 4004, you never-
3 theless thought it would be a good idea to put the numerical
4 displays in a matrix?

5 A Well, I cannot say with certainty why I decided to
6 do that. I can only say that it looks like I did decide to
7 do it.

8 Q All you knew at the time is that up in Milwaukee they
9 were using a 4004 system?

10 A Well, no. It could be, as far as I am concerned,
11 frankly, that when Frank came back, he told me that Jeff or
12 somebody had told him it was multiplexed.

13 I do not remember that to be the case, but I cannot
14 say it was not the case either.

15 Q Was there any other multiplexing contemplated by this
16 Exhibit 72 other than the digit displays?

17 A I think it probably contemplated multiplexing the
18 switches, and I wonder how I might illustrate that.

19 My recollection is that it did envision multiplexing
20 the switches and the displays.

21 Q How about the lamps?

22 A No, I do not think it did.

23 Q Do you know when you prepared that series of Exhibits
24 72 through 74?

25 A Well, okay. 72 is the drawing we have just been talking
about.

1
2 And, you mean, 73, all right, that was part of it,
3 and 74.

4 Q Yes.

5 A Well, I do not know exactly. What I know is it was this
6 September-October time frame. It was after Frank had come
7 back from seeing the system, and he wanted me to do this work.

8 Q So it was in the fall of 1974?

9 A It was pretty shortly after he got back.

10 Q All right, whenever that was?

11 A Yes.

12 Q When you prepared Exhibit 72, did you have reference to
13 anything?

14 A Sure.

15 Q What?

16 A Well, I had data sheets for all of these sheets. I had
17 reference to the material that I had described before the
18 picture that he had given me.

19 I think I remember trying to scale that picture
20 to ascertain something more about the parts that were used
21 on it.

22 I had access to some cost information from different
23 things, part of that coming from Bally Alley.

Englehardt - cross

alley

Q

Now, Bally Alley was a game which Bally had been producing prior to that time, isn't that correct?

A

Right.

Q

And actually selling on the market?

A

Right.

Q

It was a microprocessor controlled game, was it not?

A

Yes.

Q

It was not a pinball game, though, was it?

A

No.

Q

What kind of game was it?

A

It was a bowling game.

Q

When you said you had recourse to that, did you go look at a Bally Alley game?

A

I think I did.

Q

Did you look at its manual, its drawings?

A

Yes.

Q

Why did you do that?

A

I wanted to see what had been done.

Q

Well, would it be correct, sir, that you had a view that what had been done in microprocessor controlled games was pertinent even though it was not a pinball game?

A

It was the use of the 4004. So, yes, I thought it was pertinent.

Q

In a game situation, in a coin game situation? It was the use of the 4004.

A

Englehardt - cross

1 Q In a coin game situation, wasn't it?

2 A Well, could I have the whole question here?

3 Q Yes, sir.

4 You would agree, would you not, that you
5 went and studied the Bally Alley game, its drawings, because
6 what it had to say about how to use a 4004 processor in a coin
7 situation was pertinent to the task which had been given to
8 you by Mr. Bracha?

9 A I thought it might contribute something, yes, although,
10 quite frankly, that examination of that MCS-4 thing, that was
11 actually prior to this task.

12 Q I am sorry. What MCS-4 thing?

13 A The examination of the Bally Alley, I spent my time
14 looking at before that.

15 Q So you were already familiar with Bally Alley?

16 A Yes.

17 Q This came as a result of your earlier work when you
18 were first hired by Bally, is that correct?

19 A Yes.

1 Q Do you still have any familiarity with Bally Alley?

2 A No, I don't think I remember too much about it.

3 Q Do you know, sir, whether or not it puts any displays
4 or switches in a matrix and multiplexes?

5 A I think I'd just be guessing at this point if I tried
6 to remember that.

7 Q Well, let me show you something, and let's give it a
8 try. If it doesn't help you, we'll go on to something else.

9 I have here a diagram, and it's marked as Exhibit
10 8-A, and I ask you to look at it, sir, and see if you can't
11 tell me that that was the general system architecture of
12 the Bally Alley game.

13 A No, I can't verify that that drawing is.

14 Q It doesn't help you in refreshing your recollection as
15 to what that structure was?

16 A No.

17 Q Well, now, when you undertook to prepare Exhibit 2, or
18 started to prepare it, did you have recourse to any Intel
19 published material?

20 A Yes.

21 Q What?

22 A Well, I don't know exactly what I had.

23 I know I had some Intel data sheets and things.

24 Q Did you have any Intel manuals of any kind?

25 A I don't know exactly what I had.

1 Q But you did have some recourse to material published by
2 Intel?

3 A Yes.

4 Q Mr. Englehardt, I show you a copy of a patent number
5 4,198,051 to Mr. Bracha and to a Mr. Englehardt, and it's
6 been marked in these proceedings as Defendants' Exhibit 12-D.

7 And I ask if you can't identify it, sir.

8 MR. TONE: I will object to that as beyond the
9 scope of direct examination, your Honor.

10 We refrained from going into the later patent that
11 was developed, and we did so in order to keep these pro-
12 ceedings within reasonable compass.

13 MR. GOLDENBERG: Your Honor, they did go into
14 Bally's production machines and when they came on the market.
15 And this patent concerns Bally's production machines directly.

16 And I think it most important and really -- and
17 they went into Mr. Englehardt's own work and what he was
18 hired for. And this patent is the result of that work.

19 I think we're going to be able to show that this
20 patent represents Bally's commercial machines, not the other
21 patent here, the '441 patent.

22

23

24

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Englehardt - cross

2410

1 MR. TONE: Even if it did, your Honor, that
2 wouldn't prove anything.
3

4 The other patent, the patent in suit, is the dom-
5 inating patent, and that doesn't mean that both patents
6 couldn't cover the Bally machine. It would have no relevance,
7 and at any rate, the objection is based upon the limitation
8 of direct examination.

9 MR. GOLDENBERG: Well, your Honor, I really think,
10 as I say, that they have opened the door by going to their
11 production machines.

12 THE COURT: What does the fact, if it be a fact,
13 that this is the commercial machine have to do with the
14 liability issue?

15 I understand how it obviously relates to damages,
16 but what is your point on liability?

17 MR. LYNCH: Your Honor, if I may, the Graham
18 against John Deere talks about secondary considerations,
19 and I believe that your Honor has heard from the plaintiff
20 on these secondary considerations.

21 In order for there to be secondary considerations
22 validly applied to the '441 patent, there has to be a
23 nexus between that invention alone and the success, the
24 unexpected results, and the like.

25 When another invention intervenes and the success-
ful devices are also the product of another invention as

1 well, a separate patent, then the nexus is destroyed, and
2 the CAFC has so held.

3 So just on that ground alone, your Honor --

4 THE COURT: Are you referring to Dr. Schoeffler's
5 testimony?

6 MR. LYNCH: No, I am referring to the fact that
7 testimony will be offered here that the Bally device --

8 THE COURT: Will be offered.

9 MR. LYNCH: -- devices are successful.

10 THE COURT: All right.

11 MR. LYNCH: Your Honor will remember --

12 THE COURT: But I haven't heard that yet.

13 MR. LYNCH: I think you have.

14 MR. GOLDENBERG: I think you have.

15 MR. LYNCH: Mr. Nieman, your Honor--

16 MR. GOLDENBERG: Mr. Nieman gave you that testi-
17 mony and gave you sales figures over a period of time, all
18 having for its purpose to persuade you to the view that the
19 '441 patent has been a significant factor in the marketplace.

20 THE COURT: Well, all right, that sounds like the
21 issue is in the case at this point.

22 Now the question is whether this examination is
23 within the scope of the direct examination of Mr. Engle-
24 hardt.

25 MR. GOLDENBERG: Well, I think it is.

1 THE COURT: He was called -- how would you summarize
2 the tenor of his testimony on direct examination?

3 MR. GOLDENBERG: As I noted his testimony, it
4 seemed to me that he was telling you that he had come on to
5 this job. He had done this cost study. He had run into
6 these noise problems.

7 He told you about a development period extending
8 from October '74 until December of '76 and that their first
9 production game was in December of '76.

10 It seemed to me all calculated to leave the
11 impression that it had something to do with the alleged
12 invention of the '441 patent, and that is what they were
13 working on. In point of fact, that isn't what he was work-
14 ing on.

Englehardt - cross

MR. TONE: That was not the import or intent of that examination.

MR. GOLDENBERG: There was talk --

THE COURT: It wasn't clear to me whether there was a connection between what he did to check out the Nutting machine and then the work that he did that resulted in the Freedom. I was kind of waiting for a link-up between those two things, and I don't think I heard it, or if I heard it, I didn't understand it.

It seems to me that -- well, what do you say, Mr. Tone? What is your summary of the thrust of the direct examination?

If it is within the scope of that, I want to permit the inquiry.

MR. TONE: I understand, your Honor.

With respect to the '441 patent, the witness testified that he had information about the work that was going on at Dave Nutting Associates and Bracha's inspection of that machine up there and that the machine worked. He could recall very little of the detail.

Essentially what he knew was that Bracha and others had seen an electronically controlled machine in Milwaukee at Dave Nutting Associates and it worked. He may have learned some details about it, but he cannot say.

The important point on our theory of the

1 matter and the witness' testimony lies in the proposition of
2 patent law, that the knowledge that a particular combination
3 will work is in and of itself of value to someone who later
4 comes and attempts to do that very thing.
5

6 It was learned by Mr. Englehardt and
7 Mr. Bracha that it was possible to build an operating,
8 practical electromechanically controlled pinball machine --
9 I am sorry, microprocessor controlled pinball machine, and
10 they learned that it would work.

11 They proceeded with their own development,
12 and they encountered some of the same or essentially the
13 same noise problem, among others, in the course of their
14 development that others had encountered in attempting the
15 same thing.

16 That is the thrust of the testimony. It is
17 simply that.

18 Also the final point with the witness was to
19 identify several schematics and manuals as typifying the
20 entire line of Bally machines. That was a separate point.

21 MR. LYNCH: May it please the Court, your Honor?

22 THE COURT: All right.

23 MR. LYNCH: Mr. Tone has just indicated that he
24 relied on the problems encountered. These (indicating) are
25 the solutions, your Honor.

This is what purports to be the solution to

Englehardt - cross

1 those problems, and it is fair that we should go into how
2 similar the solutions were without the inputs of
3 Mr. Frederiksen and the fact that that solution merited an
4 independent patent, according to Bally, under which both
5 defendants have been sued.

6
7 MR. SCHNAYER: If I could speak to that, that
8 patent is directed to an improvement of a certain aspect of
9 microprocessor controlled pinball machines, which is inde-
10 pendent of what we are claiming here in the Nutting and
11 Frederiksen patent. It is a different aspect, and I think
12 that the fact -- we have never gone into a question at this
13 point with Mr. Englehardt the significance of what his
14 invention is and what Mr. Frederiksen's invention is. The
15 fact is we have shown, through Dr. Schoeffler, that what
16 Bally built was covered by the Frederiksen and Nutting patent.

1 Mr. Englehardt is not qualified to testify about
2 that. We have not brought his patent involved at all in this
3 suit, and to go beyond that examination, I think, would be
4 improper at this point.

5 MR. TONE: Our position, your Honor, is that one patent
6 is enough to try in this case, and if we get into the details
7 of the other, it is going to expand the issues beyond reason.

8 THE COURT: Well, I do not think that the proposed cross
9 examination about the Bracha and Englehardt patent is within
10 the scope of the direct examination of this witness. I think
11 it would be relevant to one of the issues testified about by
12 the previous witness, but that does not make it within the
13 scope of the direct examination of this witness.

14 I understand that direct examination to be essen-
15 tially that the Frederiksen machine worked according to
16 Bracha and that when this witness began developing his own
17 machine, he encountered some noise problems.

18 Now, certainly any noise problems that he encoun-
19 tered is within the scope of his direct examination. I
20 suppose how he solved those problems will be within the scope
21 of the direct examination. He testified that he worked on
22 them. So what he did about them, I suppose, is within that
23 scope.

24 We may end up covering the whole Bracha patent in
25 that way. I do not know.

1 But I do agree with Mr. Tone that I do not want to
2 open up any further material than is necessary to meet the
3 evidence as it comes along. So I suppose I am partially
4 sustaining and partially overruling the objection.

5 I think you are entitled to go into the problems
6 that he said he had, which were the noise problems and loading
7 problems and goofs in the program, transistors burning out,
8 that kind of thing.

9 MR. LYNCH: Your Honor, on a different matter, I under-
10 stand the relevance that Mr. Tone wants to have the conver-
11 sation between Mr. Bracha and Mr. Frederiksen in Milwaukee,
12 and he was shown the machine, but it seems to be lapping over,
13 and I would just like to register an objection of hearsay
14 if it is being introduced for the truth of what Mr. Bracha
15 told Mr. Frederiksen about -- told Mr. Englehardt about.

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Englehardt - cross

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1 THE COURT: I think the objection is well-founded.
2 It comes a little late.

3 MR. TONE: That is what I was going to say. I am
4 afraid it is too late.

5 MR. LYNCH: Your Honor, I thought it was coming in
6 as background for what happened to explain why Mr. Engle-
7 hardt was preparing this device, this summary of material.
8 But if it is being introduced for the truth of what happened
9 in Milwaukee, I would like to register that objection.

10 MR. SCHNAYER: Mr. Lynch, --

11 THE COURT: Well, I will take that objection under
12 advisement. We have been operating fairly informally here,
13 and I am grateful for that. We do not want to waste time
14 with a lot of objections, and I think both sides have been
15 very good about that, and I do not want you to be prejudiced
16 by that attitude either.

17 So I will just hold under advisement the hearsay
18 objection.

19 MR. TONE: All right.

20 THE COURT: How long will the cross take? How much
21 longer will the cross take?

22 MR. GOLDENBERG: Well, I understand Mr. Harding on
23 behalf of Gottlieb has some cross, and I just have one or
24 two more questions.

25 But since he is going to be here tomorrow --

1 THE COURT: He is going to be here tomorrow any-
2 way. Well, we can quit then for the night.

3 Do you have another witness for tomorrow?

4 MR.TONE: Yes, your Honor. We have -- I think I
5 am correct in saying -- three short witnesses and possibly
6 a fourth.

7 THE COURT: Let's plan to finish all those
8 witnesses tomorrow so that all we have left then is Pro-
9 fessor Kayton a week from today, right?

10 MR. TONE: Yes.

11 MR. LYNCH: Yes.

12 MR. TONE: We did have Mr. Stern, whom I think I
13 said Friday would not be available until tomorrow afternoon.
14 We have been trying to get in touch with him. He said at
15 one point that he was flying back and expected to be here
16 in time to come to court. The last I had heard, we have
17 not gotten in touch with him.

18 He will be relatively short. If we can possibly
19 do it, we will get him on tomorrow. If we do not, I guess
20 we will then have to decide whether your Honor would rather
21 bring him in Wednesday morning or bring him back next week
22 with Kayton.

23 THE COURT: Well, why don't we bring him back next
24 week. If he does not get here in time for tomorrow, we will
25 bring him back next week.

1 MR. TONE: All right.
2 (Which were all the proceedings had in the above-
3 entitled cause on the day and date aforesaid.)
4 (The proceedings in this case were adjourned until
5 March 20, 1984, at ten o'clock a.m.)
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